MEDICAL REPOSITORY,

FOR

MAY, JUNE, AND JULY, 1808.

REMARKS *on the* FUNCTIONS *of the* STOMACH, *and on the singular Case related by* JACOB HELM, *Physician in Vienna, &c. in a* LETTER *from Professor* WATERHOUSE *to Professor* MITCHILL, *dated Cambridge, March* 5, 1808.

IN pages 16 and 17 of my lecture "*On the general doctrine of Chronic Diseases*," and particularly "*on the evil tendency of the use of* TOBACCO *upon young persons; more especially of the pernicious effects of* SMOKING CIGARS, *with observations on the use of* ARDENT *and* VINOUS *spirits*," I inserted a note which excited considerable notice, and gave occasion to some good-humoured raillery among my friends, who would frequently enquire after the good woman "*with a hole in her stomach!*" The note stands thus: "*Opportunities of looking into the stomach of a living subject are very rare indeed. I remember but two instances on the records of medicine. One was a woman in the general hospital at Vienna, in* 1798. *She had her stomach perforated by a wound, which could not be closed up. Through this wound her food might be seen. When any indigestible food created uneasiness, as* sour-crout, *she took the oppressive food out with her fingers, and washed her stomach with water, and this always relieved her, and revived her appetite. Milk was observed to curdle instantly, except when she had carefully rinsed out her stomach: in this case, says* Dr. Jacob Helm, *whose patient she was, the coagulation did not take place till after some time, for want, he supposes, of gastric liquor. The coagulation could be expedited, by irritating the inner surface of the stomach with the finger. Ass's milk was longer in coagulating than cow's milk. The last coagulated in a few moments. Eggs and cheese were quickly digested, but not so soon as flesh meat. Vegetables in general were longer undergoing this process; of these, potatoes and carrots passed off soonest.*" My credulity in giving

place to this singular narrative in my publication, has repeatedly occasioned a little merriment at my expense. My only defence was, that I had taken the case from some British publication; that I found it in my book of extracts; but I had neglected to notice what publication. When a new impression of the lecture was spoken of, some of my friends *seriously* advised me to leave out the German woman "*with a hole in her stomach.*" I said but little; nevertheless I went on believing; and determined to write to my correspondent, *Dr. De Carro*, at Vienna, who has rendered himself famous by his successful transmission of the vaccine virus to the vast regions of the *East.** My first letters, *via* England, never reached him; my second, through France, had a better fate, and procured me a full and highly satisfactory answer to my queries respecting a woman who could give visible proofs of the powers of her digestive organs. This gentleman says, "There is not the least doubt of the truth of the fact, which you have mentioned in pages 16 and 17 of your Lecture. Several of my medical friends have invited this woman to dinner, in order to see that extraordinary patient. I know Dr. Helm perfectly well, and you may rely entirely upon the accuracy of his report. In the supposition that the original publication of this case has not reached you, I here send it to you from the author." The book is in German;† and I

* He sent vaccine matter from Vienna to Bagdad, and may be said to have laid the foundation of the oriental vaccination.

† Translation and Abstract from Dr. JACOB HELM's *Zwey Khranken Geschichten*, published at Vienna in 1803; *ein weib mit einem loche in dem magen*, &c. &c. by S. L. M.

Theresa Petz, of Breitenwaida (a village seven miles from Vienna) is fifty-eight years old, the mother of seven children, and had fortunate labours, though they lasted from twenty-four to thirty hours. Her father, a grey-headed man of seventy-three years, was obliged for the last seven years of his life, to keep his bed in consequence of severe pains of the gout, although he had before enjoyed the most perfect health. Her mother's health had been lasting, for she reached her seventieth year. Our patient continued in fine health until her twentieth year, and with the exception of the small-pox, never suffered any of the diseases incidental to children, and still less had she any marks of scrophula. In her twentieth year, her menses occurred and returned every month without remarkable inconvenience. She connected herself, in her thirty-third year, with Paul Petz, a blacksmith, and was very healthy in her marriage; she did not perform field-labour only, but also that of the shop, in the society of her husband, without remarkable fatigue. However, she had borborygmi, which were not accompanied with pain. From 1782 to 1796, she had several fits of cholic, vomiting, and scarlet fever, with violent burning and stitches in the side. She was attacked by some of these diseases almost every third week, which, however, during her pregnancy

am mortified in confeſſing that I am ignorant of that language, ſeeing I had ſo good an opportunity of learning it, during the four years I reſided at Leyden. The engraving

were much leſs ſevere, but never wholly abſent. In 1787, ſhe felt, whenever ſhe ſtooped to the ground, an itching pain, which was frequently as violent as if a dog was gnawing her ſtomach. It was believed to be a cramp of the ſtomach, and ſeveral remedies which were employed, ſeemed to give relief from time to time. A plaiſter that was applied to the region of the ſtomach, freed her a whole year from the pain. She ſuckled her children herſelf, but none reached their twelfth year; the moſt of them died a few months after their birth. For five years ſhe had no menſtrual evacuation without producing a remarkable relief from her pains; and when the menſes returned in 1790, but one day, ſhe was big with her ſeventh and laſt child. While pregnant, all her complaints were conſid rably diminiſhed; and when half of her time was over, ſhe perceived a ſwelling on the ſide of the ſtomach of the ſize of a nut, of a colour like that of the ſkin, which produced great pain whenever touched. After ſhe lay in, all the circumſtances were as before, except the vomiting, which had ceaſed. Whenever chilly weather was at hand, the pains of the ſtomach became ſo violent, that the patient was obliged to roll herſelf upon the ground. Her appetite was always very good, only ſhe dared not fill the ſtomach with too much food and drink, becauſe they augmented her pains. The tumour now began to enlarge in ſize and hardneſs, and in 1796 extended as far as the navel. All the phyſicians conſulted upon the caſe, unanimouſly declared it was an induration of the ſpleen, and prefcribed different external and internal remedies; but all proved uſeleſs. The only remedy which gave relief, was a mixture

of which ſhe took a ſpoonful now and then. In 1796, ſhe was attacked with anaſarca. She was then very weak, and expected ſoon to be relieved from her miſerable and painful ſituation. But as the ſwelling, in April 1797, broke by incautious preſſure, and a pint or a pound of a thin and yellowiſh matter diſcharged, her pains were diminiſhed, and alſo her dropſical effuſion diminiſhed from day to day, and wholly diſappeared in a fortnight. The opening of the tumour was at that time of the ſize of a lentil, and there iſſued from it already ſmall particles of the food ſhe had taken, as the patient herſelf related.—The author then begins his own obſervations: When he was called he found her very weak and emaciated. Under his preſcriptions the opening grew larger and larger, and by the month of July he could introduce his finger into her ſtomach. The back part of the ſtomach advanced, and was more plainly diſcernible through the opening. He often introduced a catheter as far as the upper and lower orifice of the ſtomach without giving the leaſt pain to the patient, or provoking the ſmalleſt diſpoſition to vomit. During the five years he attended to this caſe, he made the following obſervations: She always attended to her domeſtic employment, and was moſtly in good ſpirits. Her food was ſimple, as is generally the caſe with poor people. She would ſometimes take milk and water to waſh out her ſtomach through the orifice, and relieve herſelf from the ſurpluſage of food by the ſame way. After waſhing it out and putting on the dreſſing, ſhe was obliged to take food to relieve her diſtreſs and uneaſineſs. The opening was two inches in diameter; the margin was callous and almoſt as hard as griſtle, and being deſtitute of cuticle, was painful when touched. When ſhe rode in a waggon, or was ſubjected to conſiderable motion, the bile came into the ſtomach and iſſued from the orifice; it taſted very bitter; did not mix with the gaſtric juice, but inſtantly curdled the milk mixed with it. In 1800, ſhe was able to walk to Vienna, and ſhew herſelf to phyſicians and other curious perſons, and alſo to do her field labour, &c. &c.

at the end of the book represents, I perceive, the aperture through the muscles into the stomach. To remove all doubts from my mind respecting this singular case, Dr. Helm has sent me the identical perforated tubes of wood, and of metal, and also the identical little linen bag, which he had used to ascertain the powers of this woman's stomach upon various articles of food, which were put in and taken out of her stomach, as you would biscuit into an oven! I am not a little gratified in finding this doubted case so amply confirmed. My correspondent informs me, that my lecture on the evil effects of tobacco, was soon to appear in a German translation, in which my notice of this extraordinary case would be adverted to. He says the aversion to smoking was extreme among the French, but that among the evils of the revolution was the disgusting habit of smoking; he hoped, however, that as they returned to courtly manners, they would leave their pipes in their camps and guard-houses. They have given, I am also informed, a French translation of this trifling publication at Geneva, where, I learn, they have not been displeased with the compliment paid them in page 21: viz. "Cannot wisdom devise a plan of social intercourse inde-"pendent of the stimulus of the bottle? It is said such "plans existed in the city of GENEVA, before the French "inflicted the benefits of *their* liberty on that philosophic "people."

On the subject of vaccination, he gives a very satisfactory account. It is practised at Vienna, and other cities of Germany, without opposition; while I find, by letters just received from Dr. Jenner, that it is obstinately opposed by some in England. He tells me that there are some prejudices so deeply rooted among the common people, that a long time must elapse before they can be eradicated. This distinguished German, who is a botanist and an agriculturist, has taken great pains to introduce the Chinese, or *dry* rice, into Germany; and has sent me a few seeds to make a trial in the soil of New-England. It is the mountain rice, that is cultivated in various parts of the peninsula of India and in China. It grows in *dry* soils, and does not require natural or artificial marshes. If we could introduce this mountain rice, or a rice that will grow not in a *fever-and-ague soil*, but in a dry and healthy region, we should have reason to bless the name of the introducer of it. It was carried into the Isle of France from Malabar. He received

250 grains of it from China by the means of the Russian embassy, and it has ripened at Vienna. He has sent me some of the original seed, which I value equal to so many diamonds. As soon as the season admits, I shall commit them to the fostering care of our mother earth, and the result shall be communicated to you by your friend,

BENJAMIN WATERHOUSE.

Description of the INFLUENZA *or* EPIDEMICAL CATARRH, *which spread over the United States in the year* 1807; *as it appeared at* NASHVILLE *in* WEST-TENNESSEE. *In a letter to* Dr. MITCHILL *from* Dr. THOMAS G. WATKINS *of that place, dated April,* 1808.

AGREEABLY to my promise I send you my ideas on the Influenza as it appeared at Nashville, Tennessee, in November last. Previously to entering on the subject, it is, perhaps, proper to premise that a long, dry, and sultry course of weather preceded the appearance of it throughout the district which contains Nashville, situated about the thirty sixth degree of north latitude. This drought continued so late that the Cumberland river, on which Nashville lies, was said, by old settlers, to be lower than they had seen it except once; others did not admit one exception. Salt, which is brought here entirely up the Cumberland, rose to from two to five or six dollars in consequence of the difficulty of ascending the river in boats, for which it is generally navigable all the year. Grass and corn blades were suddenly parched up early in August, and continued so through autumn, and a great many constant springs were dried up entirely, or sunk from their usual level so as to fail. This state of things continued until a short time before the first of November. About the first or second day of this month, the sudden arrival of the Influenza, ushered in by cold north-eastern winds and rain, was universally announced; it seemed to fall upon all at once, but most believed they had it first, for few had time to hear it from their neighbours before they felt it themselves.

The superior or district court was sitting about this time in Nashville, which is near the centre of Mero, the western-

most and formerly the only district of our state west of the Cumberland mountains, and respectable characters were there collected from every part of the state. From the most intelligent of these I learned that the Influenza had appeared in the eastern end first, and had travelled on with them west two or three hundred miles, to Nashville, a brisk gait. It appeared to pass us there with the triumphant celerity of Bonaparte's army; the rear passing us shortly after the van reached, leaving nothing behind but the ravages it had made, and a *few* melancholy monuments of its own *feeble* mortality. It appeared with the same symptoms generally, which I have learned since, accompanied it throughout its journey from east to west, a minute detail of which would here be, I apprehend, unnecessary. For the most part it attacked the head, breast or bronchia, with the greatest violence, and often all those parts together—a violent sneezing accompanied it in many, and a troublesome discharge of hot rheum; one man said his "nose would not stay blowed a minute." I observe in my notes, made under the inspection of my students, before the Influenza appeared at all, that "I am so pestered with sneezing among my servants that I cannot eat in comfort, and it seems to be epidemic in town."

The Influenza siezed upon all ages, sexes, and conditions, producing violent cough, pneumonia, otalgia, &c. according to the predisposition of the body attacked. Men of intemperate and men of the most temperate habits, in many instances, had it with equal severity or mildness. Women in general had it lighter than men, yet I heard of more deaths from it amongst women than men. Puerperal women had it severely; those who had been giving suck some weeks or months had it lighter; sterile women had it more severely than young women in ordinary health; those with irregular menstruation, in both situations, had it worse. I heard of its proving fatal in some who had coughs and uterine obstructions of some standing; but I could learn they were treated not for the Influenza, but agreeable to their own suggestions for having "*taken cold*," a modest expression among southern and western ladies for suppressed menses. Children in general had it lighter than adults; a few escaped it; sucking infants from one to four weeks old had it worse than older children; older sucklings had it lightest. Fewer negroes were laid up with it than whites; under equal circumstances it yielded more readily to remedies in

the former than the latter when timely applied; but more negroes died of it than whites. Some few individuals escaped it entirely. Mr. Baird, merchant of Nashville, had it in Philadelphia: he did not take it in Nashville, where he had returned a little before its arrival. I heard of no persons having it twice. John Anderson, Esq. of Nashville went west of south from Nashville into the Chickasaw nation of Indians, between one and two hundred miles. He started just before the Influenza lighted upon Nashville, and I think I am correct in saying he told me he returned in within twenty days from his starting out; he had it no where; his clerk and servant man had it in the house he left, uncommonly violent, two or three days only after he started. Those two cases, two hearty women in the third or fourth months of giving suck, and a few children were the only exceptions I knew of in a very extensive practice to the universal dominion of the Influenza.

The district of Mero has been settled rather more than twenty years, at first by a very few. Within twelve years last past, however, the country has been comparatively much opened. I have been told by those on whom I rely, that first rheumatic affections were common, then autumnal intermittents, and then bilious remittents, and finally continued fevers, have in succession pervaded the settled parts of this country; each in their first order of time, simple and uniform in their nature and symptoms, and readily yielding to one simple and unvarying mode of practice, pukes and bark, venesection, purges and bark, and finally venesection, purges, blisters, bark, and spirituous potation, wine, whiskey, &c. For three or four years past however, (I have lived there no longer,) this last simple and easy nature of diseases has very much changed for the worse, and a more complicated, varying and obstinate character, has rendered the duties of a physician much more arduous, and his success much more precarious. There have been intermittent fevers that would not yield to pukes and bark; bilious fevers, so called, that would not yield to jalap and calomel, the lancet and bark; and continued fevers, with full pulse, florid countenance, and hot burning skins, &c. &c. that have been precipitated to the most dangerous states of malignity by drastic purges, injudicious bleedings, or oppressive stimulation; and indeed such has appeared to me the unstable nature of our diseases of late, and each year, and every season, presents such new un-

looked for and complicated difficulties, as to render it impossible for a physician to *foreknow* how to proceed, until he *finds out*, by careful enquiries, and a proper application of general principles to incidental fluctuating causes; otherwise he will kill "secundum artem," where his patient might have recovered "secundum naturam." No season has been more remarkable for this Protean difficulty in the nature and symptoms of our diseases, than the one of which I am speaking, before and when the Influenza came down upon us.

Quotidians, tertians, quartans, and double tertians, fevers without agues, and agues *in* fevers, remitting and continued, alike distressed and destroyed our patients, and embarrassed and perplexed their physicians. But the most prevalent disease, immediately at the time of the Influenza's approach, was a fever with a full flowing and quickened pulse, hot burning skin, and red thickish urine; sometimes a dilated pupil with a weak watery eye, but most generally a contracted pupil, with a wild and restless look and action; generally a hard, dry, and black or a glassy red and smooth tongue; if the tongue inclined to be furred, white and moist, thirst was more common; if black, dry and hard, or red, glassy and dry, it was otherwise. This fever was generally preceded by or accompanied with moderate or violent pains of the head, back or limbs, the latter were called by the sufferers "racking pains" in their bones. In Logan county, Kentucky, fifty or sixty miles northwest of Nashville, a place in general very healthy, this fever proved very distressing; many died, and others with difficulty escaped after long and tedious illness. Their physicians were violently attacked, and incapacitated from attending the sick for many months. I was repeatedly called among them, but being at length obliged to decline visiting there, on account of engagements at home, and my own ill health, I was obliged to content myself with giving such general directions to the people, as my obervations had led me to think best, and particularly to Ninian Edwards, Esq. chief justice of Kentucky, who had like to have fallen himself, ultimately, a victim to his generous exertions in behalf of others. This fever, in different directions, was treated in different ways, by many, with nearly equal success; drastic purges, bleeding and blisters, proved no more successful in one place than wine, bark, blisters and spirits did in another. Patients died, or got well, according as their constitutions

were able, or not, to withstand both remedies and disease. It appeared to me, however, that mild emetics, gentle calomel purges, alkalis, mercurials, opium, camphor, cold bath and nutrientia, with constant fresh air and cold drink, all moderately and patiently used, would have borne most constitutions safely out, if applied before any fatal congestion had already taken place. I used these and some other remedies, under various modifications, and could I have seen or known that any other plan succeeded better, I would have adopted that. *Bark would not do*, and bleeding I felt fully impressed was injurious in most diseases which occurred before the Influenza; but the very moment this transient epidemic took hold, in almost all cases, there appeared contrary indications; the pulse instead of full and flowing, became small and locked; its diameter was reduced to one half, one third, or one fourth, but attended with a sly sharpness. The tongue instead of dry and hard became white, soft, and furred, and the urine assumed a bright yellow or straw colour. Delirium rarely ever occurred; but an almost indomitable dryness of the skin, in the commencement of most cases, seemed to aggravate every other symptom. Pains in the ears, eyes, breast or side were very common and very severe. In Mrs. Nathan Hooker, a *violent* pain in the head alternated with an acute pain in the side, and during its prevalence in either part she felt entire relief in the other. In most cases where pains in the ears or eyes occurred pleuro-pneumony did not, or was less violent, but the latter was most common. Upon this sudden change in the symptoms of diseased persons, I found it necessary to change my practice. Bleeding was in many cases *necessary*, in most useful, and in all these its good effects were instantaneously visible. I have been called in great hurry in the night to persons not used to call on physicians, who had the disease violently, sitting erect and writhing under violent pains and difficulty of breathing, with a hard cough. A pint of blood drawn directly, and an active bolus of calomel, worked off with sweetened cream-of-Tartar-water, have in a few hours produced the most unexpected relief. A cooling regimen, particularly cool drinks, appeared most salutary; and indeed those who took the disease, or rather those whom *it* overtook travelling, (if they continued on, and most did) had it lighter, and rarely required, or had, medical aid until housed. In those cases where pneumonia occurred, I found it necessary, as I thought, to bleed more cau-

tiously than where the head was chiefly affected. In the former, Typhus often succeeded Influenza, in the latter never that I saw. Severe pains in the ears, first in one and then the other, usually terminated in suppuration with or without bleeding, but this course seemed to be sometimes prevented by bleeding. Paregoric elixir for the cough, and opiates, in every shape, seemed injurious in most cases until after bleeding, and other evacuations, and particularly purging; to this there were some, but very few exceptions. Many who were attacked with violence, if not early and copiously evacuated, especially those who took heating things, inclined to spasms, opisthotonos, paralysis, and tetanus, all of which states myself and others witnessed about the second week from the commencement of Influenza in our neighbourhood, and we neither saw nor heard of them before nor after. These appeared to me the symptoms of Influenza and to give the indications of cure, where it was simple and unmixed; but this, though generally, was not universally the case. In short, the following appeared to me essential general ideas for the medical mind to attain, during the prevalence of the Influenza: 1st. It seemed necessary to general success to conceive, that a sudden universal cause might somewhere or somehow arise, calculated as suddenly to swallow up existing causes of disease, or so bear down their local influence, or incorporate them with itself, as to produce a new disease *sui generis*. 2dly. It appeared equally necessary to success, in particular cases, to conceive, that such an established predisposition might have become already so fixed in some constitutions, to be diseased from a pre-existing cause, as to exclude the influence of a new and supervening cause, in which case I supposed the latter might act principally as an exciting cause to the former. And 3dly. Universal success seemed to require a further conception, that such a combination of the two causes might exist as to produce, blended together, a contending influence in the system, without a marked ascendency of either. I did see cases where bleeding injured during the height of the prevalence of Influenza, and stimulants above ordinary produced restlessness and distraction. These cases seemed to go on best with gentle laxatives, a cool regimen, alkalies, cider beverages, and then opium, calomel and camphor. In many cases the appetite was lost, in most but slightly impaired, but few escaped a depraved state of taste and smell, and deafness was fre-

quent, and in some of several weeks duration. The muscles of the face, eyes, and mouth, of my friend Dr. Sappington, were so distorted by spasms, paralysis and contractions, *from the Influenza*, that the fear alone of wounding his feelings prevented me from objecting to his bleeding Mrs. Watkins and myself, after having sent for him for that express purpose. Having been rather too free in the use of stimulants upon the appearance of paralysis, he was obliged afterwards to have recourse to his first plan of depletion. Towards the latter end of the second week of the reign of Influenza, it became evident it was going. I left the western country for Washington city before I learned where it went, but not until I had heard of it on the road to Louisiana, and I have no doubt but that it will outstrip the conspirators, and surprise first the Mexicans. After the departure of the Influenza, the fever which I have described as prevailing before it came, and which I sometimes called one thing and sometimes another of the malignant kind, according to its violence, gradually crept up again, only a little frightened out of its natural appearance, and forced to assume a new complexion from the Influenza's superior power. Instead of pains in the bones, it appeared now with pains in the chest and side, with obstinate cough in the form of a typhoid pneumony, now a still more mongrel disease, and requiring a more mongrel kind of treatment than before. There was one thing I thought remarkable in my *impressions* during the prevalence of Influenza, and I practised very much from *my impressions*. If I felt a small unfrequent pulse, with a somewhat coolish dry wrist, with symptoms otherwise pretty bad, I felt no disposition to hesitate about using the lancet; but if I felt a full and quicker pulse and hot skin, I instantly felt doubts. The Influenza seemed determined to enjoy the noblest kind of triumph over its victims, by always leaving them the full exercise of intellects. I neither saw nor heard of many cases of delirium, while otherwise the violence of other symptoms seemed to threaten certain death. Spirituous drinks, with other hot stimulants were used by many people, and great cures were ascribed to them; but I believe, and upon good grounds, that it was only where people could get well in spite of every thing. Frequent sips of cold water kept the cough under, in my friend Dr. Phillips, better than the usual expectorants or opiates.

During my own confinement, my house was almost con-

stantly filled with applicants; I shewed them my arm, my laxative and cooling beverages, and advised them to return home and follow my example, and tell their neighbours to do the same; they did so, and always reported favourably. While the Influenza lasted, and when the case was altered, I advised them to alter too.

In many parts of the western country the Influenza was said to prove fatal: some few died in the neighbourhood of Nashville. For my own part I did not see much necessity for any body's dying with it, and if they had been treated right I do not think they would; not even those who had previous indisposition, for in such it was only necessary to strike more immediately at the Influenza. Some who had bad coughs and obstinate complaints of the breast, were cured of them by the influenza or something else whilst it prevailed. Those who were under the use of calomel, when the Influenza came, I *thought* had it lighter for it. I know there was greater complaint of salivation, from calomel purges during its influence. These are my ideas, Sir, as they were impressed on my mind by this itinerant pest. If you think they can afford any thing useful to the public, I shall be glad; if not, I shall be quite content if you will accept them as an evidence of my disposition to oblige you in trying what I can to aid your useful exertions for the public good.

I am, Sir, very respectfully,
Your most obedient,
THOMAS G. WATKINS.

A brief HISTORY *of the* INFLUENZA, *which prevailed in* 1807. *By* SHADRACH RICKETSON, *physician in New-York.*

ADVERTISEMENT.

In writing a history of the Influenza, two plans might have been pursued.

One was, to give a circumstantial account of the disease, with the opinions of various authors, both ancient and mo-

dern. Another was, to exhibit a summary of it, as it appeared in 1807.

The former plan was first contemplated, and some progress made; but it was afterwards relinquished, and the latter adopted for the following reasons: first it is a popular disease, and therefore a description of it may be acceptable to common, as well as to professional readers; secondly, most medical publications are now extended to an enormous size and expense, by which means their diffusion and usefulness are greatly lessened among many, even of the Faculty.

S. RICKETSON.

New-York, 4th Month 1808.

THIS disease is ranked by Dr. Cullen in the Class of *Pyrexiæ*, Order of *Profluvia*, Genus of *Catarrhus*, and Species *a contagione*.

The word *Influenza*, signifying influence, is said to be of Spanish or Italian derivation, and to have been given to this disease from a general opinion entertained by ancient physicians and philosophers, that disorders were occasioned, and all things upon the earth were governed by the influence of the stars or heavenly bodies.

It was known from the time of Hippocrates to that of Sydenham, by the name of *Febris Catarrhalis Epidemica;* but it was called by the latter author, *Tussis Epidemica.* Since his time, it has mostly been distinguished by the appellation of Influenza.

Though the present term is, comparatively speaking, modern, the disease is not so; for, on recurring to the history of medicine, we shall find it anciently and frequently described under one of the former names.

It is mentioned as prevailing often in England, in the course of the last century, particularly in the years 1762, 1775, and 1782; and, in a light degree, in 1795 and 1797; and again very generally in 1803.

By information lately received from Liverpool, I understand it was prevalent in that place last winter.

This disease has also prevailed in North America many times prior to 1807: particularly in 1733, 1737, 1747, 1756 & 7, 1761, 1772, 1781, 1789 & 90.

It likewise appeared, in a light degree, in the autumn of 1793, in Dutchess county, in this state, where I then practised; but, at no time, within my recollection, has it prevailed so generally and severely as in 1789 and 1807.

Before describing the history and symptoms of the disease, it may not be improper to observe the state of the weather during the two last summer months in which it appeared. This cannot be done better than by recurring to the meteorological tables of that time; from which it will appear that a great deal of rain had fallen; and that although the weather had been hotter than that of the preceding summer, there have been two remarkable transitions to a cool state of the air, viz. in the evening of the 28th of the second summer month, and on the 22d of the last. Indeed some judged that the former sudden change was the cause of the complaint; but a few instances were observed nearly two weeks before that time. It might, however, have aggravated it; for it was remarked to increase in severity, and to spread rapidly soon afterwards, so that in 8, 10, or 12 days, it was at its height.

It being usual in recording the histories of epidemic diseases, to mention such disorders as immediately precede, accompany, or follow them, it may be proper to observe, that a violent species of opthalmia prevailed somewhat generally before it. This affection of the eyes, though it was sudden and severe, and produced, in some instances, an immediate suffusion of the adnata, yielded mostly to the usual remedies. Some cases of this complaint continued after the appearance of the Influenza, but it did not secure the system against the latter, for some had both. I had one patient, whose affection of the eyes terminated in the Fistula Lachrymalis.

Some instances of the Influenza occurred as early as the middle of the second summer month, but it did not become general till about the first of the next, when it increased so rapidly, that in a few days, it was judged nearly one half of the citizens were affected with it.

It spared neither age nor sex, though more children escaped than adults; and I think fewer women were violently affected than men.* It was most severe with people

* I have been directly informed, that, in the Friends' Boarding-School, in Dutchess county, containing nearly 100 scholars, the girls generally passed through the disease, before the boys were affected with it, though all under the same roof.

And a letter from Burlington, New-Jersey, mentions, that a family in that town, consisting of 13 or 14 persons, all escaped the complaint, whilst in many families, every individual was attacked with it, and no other family escaped it.

To what cause can these facts be owing?

whose situation or occupation exposed them to the inclemencies of the weather. These suffered most frequently from relapses.

It continued to prevail till about the 20th of the last summer month; after which not many recent instances occurred, but some remained long ill who had the disorder severely.

I myself suffered a severe attack of it after the middle of the first fall month.

It is estimated that three fourths of the inhabitants had, sooner or later, more or less of the disease; but although it was so general, it rarely proved mortal, and did not, in every instance, require medical attendance, mostly yielding to regimen and simple domestic remedies.

This observation respecting its mildness and mortality, is to be understood in a general sense; for some cases occurred that proved very obstinate and almost callous to medicine, and a few terminated unfavourably; though many could not be said to die of the disease alone, most of those instances being sudden hemorrhages occasioned by the violence of coughing, or by accelerated pneumonic and other pulmonic complaints.

All those cases are, I suppose, included in the bills of mortality under the name of Influenza; but these are admitted to be often inaccurate.

Perhaps no disease has ever been observed to affect so many people in so short a time, as the Influenza, almost a whole city, town, or neighbourhood becoming affected in a few days; indeed much sooner than could be supposed to spread from contagion.

Mercatus relates, that when it prevailed in Spain, in 1557, the greatest part of the people were seized in one day.

Dr. Glass says, when it was rife in Exeter, in 1729, two thousand were attacked in one night.

Notwithstanding the general opinion long entertained, and handed down from one physician to another, of the contagious nature of this disorder, it is hoped there are now sufficient observations and incontestable facts to question, and even to disprove that idea: to adduce all which, would lead beyond the limits of this essay.

I have received no authentic information of any neighbouring city, town, or part of the country, being affected with it before this city; but about the same time, or soon afterwards, it extended rapidly in every direction.

On revising my notes which I preserved of the Influenza in the autumn of 1789, in Dutchess county, I find it remarked, "that the disease appeared first to the southward, and travelled gradually northward and eastward till it pervaded the continent."

Dr. Rush, in his account of the disease in that year, remarks, that he first observed it in Philadelphia, in some members of congress who arrived there from New-York.

From which account, and from its appearing here the last time, it is evident, that this city has been twice the origin and centre of the disorder; but to what particular exciting or remote cause, whether to a certain state, modification or change of the atmosphere, or to some other latent principles we may impute it, is not yet clearly ascertained, and must be left to be determined by accurate observation and future experience.

Various conjectures were formed respecting the succeeding health of the city; some predicting, with much certainty, that it was a precursor of the *typhus icteroides*, or yellow fever, which has so frequently and severely visited this place; but experience has shown the fallacy of such an opinion, for, in no season for several years past, has that disease been more rarely observed here; others judging it, with more probability, to be a modification, or a substitute for it.

Neither before the appearance of the Influenza, during its prevalence, nor after it, did I know of any epidemic or unusual disease in the city, except the opthalmia already mentioned, scarcely any other disorder of much importance or severity appearing in the time of it.

The symptoms which characterized the disease, were not much different from those that attend a heavy cold. The severest cases were generally ushered in with an ague, chill, or sensation of cold; a hoarseness, soreness, and, as some expressed it, a rawness of the throat, lungs, and stomach, accompanied with an urgent cough or hawking. This last symptom was so general and severe, that people were almost constantly heard coughing or hawking in meetings and along the streets. Pains in the head, chest, back, or limbs, and frequently in all, with a lassitude, restlessness, and great prostration of strength, almost universally attended. The pain in the head was often severe, accompanied in a few instances, with a vertigo or slight delirium. In some cases, it centred much in the frontal sinuses; in others, it affected

the jaws, exciting great soreness in the parts, with tooth-ach; and in a few, it pervaded the ears, occasioning tinnitus aurium and deafness.

The pain in the breast resembled, in some instances, that of Pneumonia, particularly the Peripneumonia notha, or Intercostal Rheumatism. Those in the back and limbs, were often severe and similar to the pains accompanying the accession of Typhus and some other fevers.

When the Trachea and Larynx were much affected, the respiration and cough exhibited that peculiar croaking noise which takes place in the Cynanche Trachealis or Croup.

Sometimes a diarrhœa, at others, a nausea, but more frequently a constipation of the bowels, with thirst, a furred tongue, quick pulse, but not very full, high coloured urine, and more or less fever, accompanied the complaint.

A deprivation of the smell, taste, and hearing, a sneezing and running at the nose, were likewise very general symptoms. No disease, perhaps, bears a greater likeness to it in the accession, than the Measles, which followed not long after, and are still prevalent in the city.

Indeed, the similarity or connexion between the two diseases is so great, that some writers have remarked, that one frequently or generally succeeds the other. This was the case in 1789 and 1790, in which years, both these disorders prevailed.

I had one patient severely attacked with the disease, whose pulse rose and continued several days about double the number of the healthy standard; but she recovered.

The blood let in this epidemic did not generally appear much sizy, except in some cases attended with Pneumonic symptoms; nor did the crassamentum often exhibit that cup-like shape which is so commonly observed in other diseases of the order of Phlegmasiœ.

The most robust patients very commonly swooned under the operation of venesection.

Some who had the complaint severely, with violent coughs, discharged blood from the nose, lungs, or by stool. A few fatal instances occurred of the two last kinds.

Uterine hemorrhages and abortions took place in some women, whose coughs were very urgent.

Some, after having passed through the height of the disease, being intemperate, or exposed to cold or wet, suffered relapses, which often proved more severe and lingering, than the original complaint. The greatest number of deaths

were from this cause, or from consequences of the disorder.

The treatment of this disease was not conducted on the same plan by all physicians, some treating it merely with a dietetic regimen and simple domestic remedies, while others used blood-letting and copious evacuations.

The middle plan was, I think, attended with the best effects; for, I generally observed, that bleeding and strongly depleting remedies greatly weakened the constitution, and rendered the convalescence slow and tedious.

A large proportion of those affected were so slightly ill as to require little or no medicine, besides the treatment usual in cases of common colds; but when a person was seized with a violent attack of the complaint, I advised to lie in bed, or to keep in a room of moderate temperature, and to promote a gentle perspiration, by bathing the feet and legs in warm water, and by drinking freely of warm infusions of sage, catnep, thoroughwort, or snakeroot.

Wine-whey and mustard-whey were also used by some, and were very proper in debilitated constitutions, and for ancient people.

If these means were found insufficient to bring on a moderate sweat, it was further encouraged by the addition of spirits of Mindererus, or Dover's sweating powder.

When the preceding remedies proved ineffectual in promoting a free perspiration, and the pain and other symptoms continued very distressing, the general warm bath, or the semicupium, was found very successful.

Rubbing, or bathing the patient in warm vinegar, or enveloping him in flannel blankets wrung out of it, as hot as could be borne, has succeeded in some cases, after all other means have failed.

The utility and success of the last application are not confined to the Influenza, but may be extended to various other disorders in which a copious sweat cannot be procured by other means.

In cases attended with much nausea, it was advisable to rinse the stomach with warm water, carduus, or chamomile tea; and when that symptom was distressing, it often became necessary to administer gentle emetics of ipecacuanha, antimonial wine, or white vitriol; which, when a sweat could not be procured in the early part of the disease, by any of the means already mentioned, being given in nauseating doses, often had a good effect in promoting that excretion.

After the operation of an emetic, if the sickness continued, the effervescing draught, or the saline anti-emetic mixture, was found useful both in removing the nausea, and in promoting a moisture on the surface of the body.

The bowels being generally costive, early attention became necessary to open them with some purging medicine, particularly with those of the saline kind, such as Glauber's salt, soluble tartar, or crystals of tartar; some preferred jalap and calomel; others used castor oil; and with many, Lee's pills were a popular remedy; but I know of no cathartic better adapted generally in the complaint than jalap or rhubarb and vitriolated tartar, thoroughly rubbed together, particularly for those whose stomachs rejected the other kinds.

Calomel was occasionally added to the last, when it did not prove sufficiently powerful. Those who had long neglected to take physic, and whose bowels were not readily moved, were much relieved by the seasonable use of purgative injections.

The cough and soreness of the throat and breast, being early and urgent symptoms, required particular attention.—They were kept moderate, and were relieved by the liberal use of mucilaginous drinks, such as infusions of wheat bran, pearl barley, quince seeds, marshmallows, red-elm bark, flax-seed, or liquorice, or of some of the demulcent gums, with the occasional interposition of oily medicines and opiates; the last of which were found frequently and indispensably necessary to appease the cough, and to procure sleep.

Opium, however, was rarely observed to give that ease in the early part of the disease, before a perspiration took place, which it did afterwards.

Soothing and instantaneous relief was obtained in some cases attended with incessant coughing, great soreness, and difficult respiration, by inhaling the vapours of the decoctions of mucilaginous or demulcent herbs; or when these were not accessible, those of warm water only, through some suitable apparatus.

Mudge's Inhaler is well adapted for this purpose, and may be easily fitted and kept in every family; or, when that cannot be obtained, a coffee pot, or a common funnel, may be substituted, and used to considerable advantage.

The receiving of the vapours of the infusions or decoctions of emollient vegetables, or even of simple warm water into the lungs by inhalation, is a sovereign remedy, too little

known, and too much neglected, not only in the Influenza, but in various other catarrhal, pulmonic, and anginose affections.

I omitted to mention blood-letting as an early remedy in this disease, judging it not generally necessary in the treatment of it; in which, I am sensible, I differ from many practitioners. I have already remarked, that the pulse was rarely full or hard, that the blood was not, except in some particular cases much sizy—that a languor and prostration of strength universally accompanied—and that the most robust patients generally swooned under the operation: for which reasons, I rarely bled in any considerable quantity, except in plethoric strong constitutions, attended with a full hard pulse, and severe pain in the head or chest, threatening phrenitic or pneumonic affections, when I did not hesitate to practise and repeat it, if necessary, according to the nature and urgency of the symptoms, with the occasional use of blistering and other remedies usual in such cases. Topical bleeding, either by cupping, or by the application of leeches, to some part of the chest, I considered as more admissible and better adapted than free blood-letting from the arm.

Blisters were useful not only in relieving the pains in the chest, but in abating the soreness of the throat and the distressing sickness and vomiting which attended some severe cases of the complaint, and which did not yield to other remedies.

Strong sinapisms applied to the feet, had a good effect in relieving the head, throat, and chest. These with stimulating and rubefacient liniments, with a portion of laudanum, were also useful applications to the chest, when blisters were omitted.

After the crisis of the disease, and after the abatement of the catarrhal symptoms, the consequent fever in some cases, put on an intermittent or remittent form, when the bark, bitters, and other usual remedies in fevers of that kind, became indicated. The same treatment, with chalybeates and the vitriolic acid, was necessary, when the disorder was succeeded by great debility, or profuse night sweats.

A few instances were said to put on a typhoid character, or to degenerate into a fever of that type; when they were to be treated accordingly; but I did not meet with many of this kind.

Before closing this account of the Influenza, it may not be improper to mention that soon after the disease became

general in this city, I published a letter, containing a short description of it, with the mode of treatment, designed and adapted principally for popular use; and that, after the disorder had nearly disappeared, I issued a circular letter;* directed to the physicians throughout the United States, requesting their attention and assistance in transmitting to me accounts of it in the several places where they resided, in order to write a circumstantial history of it. In consequence, and in compliance with which, I received various communications from different parts of the Union.

This information I intended to incorporate with my remarks, or to add by way of supplement to them; but, on reviewing those several communications, and on summing them together, I find very little important matter to record in addition to my own observations on the subject, or different from them. I shall, however, note a few particulars.

Most of the accounts mention its appearance not until a considerable time after its prevalence in this city. It evidently first appeared here, and spread gradually and rapidly in every direction, its progress being clearly traced from one town and country to another.

Letters from Pittstown in Rensselaer county, and from Whitehall, in Washington county, in this state, say, that it appeared in those places about the middle of the last summer month. A person informed me he was attacked with it on Lake Champlain, on his passage from Canada to this city, in the fore part of the first Fall month.

Another letter from Ovid, near the Seneca lake, states, that the disease was not frequent there till the latter part of the last Summer, and the beginning of the first Fall month; and that the latter may be considered the month in which it prevailed in that part of the country; and that it was about two weeks earlier at the Seneca river, and gradually progressed between the lakes to the southward.

By a letter from the Bay of Quinti, in Upper Canada, it appears not to have passed through that country till the two last Fall months.

In most of the communications received, in answer to my Circular Letter, the symptoms of the disease are described as being more inflammatory, and denoting a greater phlogistic diathesis in the system, than were observed in this city. This may account for the more liberal use of the

* This letter will be annexed to this History.

lancet, which appears to have been used in many places as a general remedy; but it is no new thing that other diseases are attended with different symptoms at different seasons, and even in different places at the same season; and that they consequently require different modes of treatment.

During the prevalence of the disease in this city, I observed no unusual sickness among domestic animals; but several of the accounts received, mention, that horses and dogs were disordered; one saying, that "many died:" another, that "a singular and unusual affection prevailed among horses during the month of August, and fore part of September, viz. an extraordinary discharge of saliva (not the ordinary frothing from fresh grass but a constant and excessive flow of pure saliva from the mouth, without any morbid appearance of the parts of the mouth itself, or any other of the animal, except that the beast, in some instances appeared at times a little hollow; but otherwise in ordinary health and spirits. A young mare of about five years old, having her head confined over a trough, discharged two quarts in about an hour and an half, yet she kept her flesh and worked well. This appearance, for it can scarcely be called a disease, prevailed, and was remarked by many all over the country for many miles around, and lasted, like the Influenza, about 18 or 20 days."

"The same account says further, that the Influenza was then called the "Horse distemper, by which name, it has been almost universally known, among the common people, for 30 or 40 miles around."

CIRCULAR.

To the Physicians in the different parts of the United States.

The recording of epidemic diseases having been long observed by physicians to be useful in developing their history, prevention, and cure, a request is hereby made of the physicians throughout the Union, to collect from actual observation, and to transmit to me in New-York, an account of the Influenza, which is now rapidly spreading in different parts of the continent.

The particulars, on which information is more particularly requested, are the following:

1. The time of the first appearance of the disease.

2. The symptoms that characterized it.

3. The remedies that were found most successful in alleviating and curing it.

4. What proportion of the inhabitants were affected with it: whether it proved mortal: and in what number of cases.

5. What diseases immediately preceded, accompanied, or followed it.

6. Whether any unusual sickness was observed to prevail about the time among domestic animals, such as horses, cattle, sheep, dogs, and cats.

Though obtaining an accurate history of the Influenza, in different places, was the particular object of this address, yet information of any other late epidemic, or uncommon sickness, deserving notice or record in the annals of Medicine, will also be acceptable.

It is desired, that communications may be made as soon as convenient, post paid, or by private conveyances, if such present. SHADRACH RICKETSON.

New-York, 8th mo. 25th, 1807.

An ESSAY *on the* TEMPERATURE *of the* SEASONS *in different years, and on the Course of the* WINDS, *particularly upon the Atlantic Ocean in the Northern Temperate Zone, and the Countries adjoining that Ocean. By* MARK LEAVENWORTH, *Esq. Written in France,* 1807, *and communicated for the Medical Repository by* SAMUEL RUSSEL, *Esq.*

(Continued from vol. xi. p. 374.)

SECTION 6. *A combination of different powers is necessary to produce variable Winds.*

Before inquiring what may be the immediate cause of the air of the trades being occasionally drawn out of our northern circuit, by which event the variable winds of the Atlantic and adjacent shores in the northern temperate zone are produced, it may be well to inquire,—*What concurrence of circumstances is necessary to produce variable winds?*

For this purpose, let us in a few words inquire—1.° What winds would exist, if the atmosphere of our globe was not influenced by the sun, moon or any other distant body? 2.° What winds would exist, if our atmosphere was to remain subject to the influence of the earth and sun as at present, but not influenced by any other body? 3°. What combina-

tion of influences is necessary to produce any variable winds whatever?

If our earth could continue its diurnal and annual movements, and the atmosphere still remain unaffected by the sun, moon, and all distant bodies, it would seem that the atmosphere governed in its rotation by the same laws as the earth, water and other parts of our globe, would roll with them; consequently, the air, as to its position on the earth, would remain as stationary as the water, and we should have no winds whatever. This opinion seems not only to be supported by physical principles, but it has in support of it the evidence of our senses; for the globe is constantly performing the movements we here suppose, and still we see no current of air which can be attributed to those movements. But even if we were to adopt what seems an erroneous idea of some philosophers, and suppose that a current of air would in such case be produced by centrifugal force and by the unequal gravities of different parts of the atmosphere, still this current, being uninfluenced by any other cause, would always be the same through the whole year, and as regular as the movement of the earth which produces it.—This is the only wind we could possibly have, and it seems scarcely possible we should have even this.

If we come in our supposition one step nearer to the actual state of things, and suppose our atmosphere to be under the full influence of the earth and the sun, but not influenced by any other cause, we should then have winds which would vary from season to season, just as the influence of the sun should vary, that being the sole cause of their existence.

The figure not only of the earth, taken as a whole, but of the several principal parts, such as the continents, the oceans and the mountains, remain nearly the same from year to year; so also the nature, volume and weight of the atmosphere remain nearly the same; the motions and positions of the earth relative to the sun by which we compute our seasons, are nearly the same every year; and consequently each part of the earth is about equally exposed each year, and in the corresponding season of each year, to the heat of the sun and to the rarefactions, condensations and any other influences which may result from that cause.

In short, every circumstance relative to the nature of the atmosphere, the figure of the earth and its position relative to the sun, are so nearly the same every year, that if the currents of air were not affected by some body other than the

earth and sun, these currents might be expected to be as regularly the same every year, as the currents of water in the rivers; perhaps even more so.

It is not that the sun produces no effect on the currents of air, for this is too visible in the trade winds, and in the sea and land breezes near the shores in hot climates, to admit of doubt. But the influence of the sun on each part of our earth being the same on the corresponding day of every year, we should, on any given day of the year, if no other cause had any influence, always have the same wind, the same degree of heat, and the same quantity of moisture.

Neither the influence of the sun nor any other single, uniform influence can produce variable winds; that is, such winds as do not simply vary from season to season as the seasons themselves vary, but such as are different in force and direction in corresponding seasons, or corresponding days of different years, or other corresponding epochs of the period in which the cause operates.

To produce variable winds of this description, it is apparent that the influence of some other body, operating in a manner opposite to or different from that of the sun, must be combined with the influence of the sun. Nor is it sufficient that the influence of two powers be combined to produce variable winds; they must be so combined that the variations in the force of their influence or in the points of the earth on which they act do not fall together at the same periods; for two powers, operating uniformly together, would produce as uniform effect as a single power.

It seems, therefore, that nothing can produce our variable winds on any part of the globe, but the influence of at least two powers operating, relatively to each other, differently at different times.

Though the influence of the sun, in producing and directing the currents of air, is more visible than that of any other body, still it may be doubted whether it is more efficacious than that of the moon. This influence has been undoubted by a great part of mankind, for many centuries; but it has been so combined with other causes, that the effects have seemed very irregular; and in fact, the result of the influence at different times has been different according as it was more or less affected by different combinations.

This apparent irregularity has been such, that many philosophers (naturalists) have doubted whether any such influence of the moon existed; and few have ever examined in

what way the effect is produced, or even what the effect may be.

Section 7. *Circulations in the Ocean.*—Before inquiring into the manner in which any of the celestial bodies can produce our winds, and particularly the manner they can produce the trade winds, and the circulation depending on them such as we have described; let us remark that in the region of this circulation, there exists also a circulation of the waters of the ocean, exactly resembling that of the air of the atmosphere.

Currents in our harbours, and round our capes, are easily discovered, and their velocity is easily measured; but these currents, being generally the effect of the figure of the land on the movement of the tide at the place, are of little extent, while the great currents of the ocean are difficultly observed, and have been but little studied.

It is however well known, that in the equatorial latitudes of the Atlantic there is a slow but constant movement of the waters from east to west; and that near the coast of America, at the point where the air of the trade winds turns north and north east, there is also, in the same direction, a strong current in the ocean. The Gulf stream, which runs from the Gulf of Mexico, sometimes as far as the banks of Newfoundland, then turns east and south, and sometimes, particularly near the winter solstice, it turns east, and afterwards southerly, before arriving so far north.

Though the existence and direction of this current has been ascertained by observations in some parts only of the region of the northern circulation of the air of the trades, still it is sufficient to prove a circulation in the ocean, similar to what exists in the air; for so great a current as the *Gulf stream*, could never run from the gulf of Mexico towards the north east, and then south east, unless it was supplied with water from the equatorial latitudes; nor could the waters, brought to the northern and eastern parts of the ocean, find an issue, if they did not go again into the circulation in the equatorial latitudes, where the water moves to the west to supply the current at the gulf of Mexico.

There has indeed been a very vague idea that the waters of this current might be derived from the river Mississippi and the other rivers which enter into the gulf of Mexico. It is however scarcely probable that all these rivers afford greatly more water than to supply the evaporation of that gulf, placed in the hot regions of the equator. But if the

whole water of all these rivers was to enter into the gulf stream, without losing any thing by evaporation, in its passage over 12 or 15 degrees of longitude on those hot parallels, still the mouths of all these rivers, computed at those parts in which their current is sensible, can scarcely exceed six or eight leagues in breadth, or three or four fathoms in depth, which can not afford water in any proportion to that current in the ocean, of a degree or two in breadth and of unfathomable depth.

Nor has there been more current remarked to issue from the mouths of those rivers, in the gulf of Mexico, than there is near the mouths of other great rivers in other seas, which is almost nothing at a small distance only from shore. In fact these rivers bring very little water to the ocean, during the summer months, which is exactly the time the gulf stream is generally supposed to be most considerable, nor has this current been noticed as rapid, near the mouths of those rivers.

It therefore seems clear that this great current is supplied by water from the equatorial latitudes of the ocean, which arrives by a movement from east to west in the region of the trades till it is stopped by the continent of America, just as the air of the trades in the same region is stopped at the same place, and then the water like the air, turns north and north east, and then east and south east, till it reaches, as we have said, the tropical latitudes, near the coast of Africa, when it is again in the current to the west.

This circulation of the waters of the ocean differs from that of the air in the same region, in two respects. First, when the water in its slow current to the west, in the equatorial latitudes, reaches the continent of America, it is always wholly stopped in its movement in that direction, and consequently it never fails to turn northward into the gulf stream, and to continue the circulation during the whole year, just as we have said the air would do if uniformly and wholly stopped by that continent.

A second difference is that the air moves much faster, in the region of the trades, than the water of the ocean moves in the same region. The cause, to which we believe this difference is due, will be easily explained when we come to examine the cause of the trade winds and of this movement of the water in same direction, which will be the subject of another section.

The greater velocity of the movement of the water in the

gulf stream, than in the other parts of the circulation, is so obviously the effect of the figure of the land at the gulf of Mexico, and the parts near it, that it needs no explanation, and tends to illustrate the general similarity in the circulation of the two fluids.

In addition to these two circulations, one of the air of the atmosphere, and the other of the water of the ocean, there seems to be also in the same region a similar circulation of the oscillations of the tides.

These oscillations, visibly produced by the influence of the sun and moon, move from east to west, in all the equatorial latitudes, and with the same velocity with which the bodies which cause them, move. Among all the different opinions relative to the tides, this has seldom been doubted, and seems scarcely susceptible of doubt.

But when these oscillations arrive at the coast of America, their course in that direction is stopped, just as is the horizontal current of the air of the trades and the similar current of the water of the ocean in the same region; and it seems that those oscillations, when stopped, must take the same direction as the other two circulations; and consequently that our tides, in the temperate zone, are not produced immediately and directly by the attraction of the sun and moon, as they are at the equator, but are only derivations from those produced in the equatorial latitudes.

That our tides run from west to east, opposite to the course of the tides at the equator, seems strongly probable from the existence of a current, an horizontal movement of the water in that direction; for it would seem very difficult to suppose an horizontal movement of the water in one direction, and a movement of the oscillations in an opposite direction, unless it were occasioned by a current in other waters than those in which the oscillations originate, as at the mouths of rivers. Tides, that is, the oscillations, at the mouths of rivers do indeed run up the river while the current or horizontal movement of the water is towards the ocean; but this is occasioned by the current of the river, which brings water to the ocean from a greater elevation, and which being stopped by the rising of the tide, at the mouth of the river, first runs more slowly, and consequently rises just as it would do if a partial dam had been made at the mouth of the river, and after having run some time, more and more slowly, if the tide continues to augment, the

current becomes in the same direction as the movement of the oscillation, that is, up the river.

The observation of the currents at the mouths of rivers, affords strong proof that a current always exists in the directions in which the oscillations move, whenever an opposite current is not caused by waters from a greater elevation.

If tides in our parallels were produced directly by attraction, as in the equatorial latitudes, we could have but very little oscillation in our seas, and but little tide in our harbours.

The attraction, which produces alternate ebb and flood at the equator, must produce an uniform effect at the poles, where there can be neither flood nor ebb; and the elevation which is greatest at the equator and nothing at the poles, could not in our parallels, be half as considerable as at the equator. And while we could not have half as much elevation of tide as is produced at the equator, the little we could have, would not move from east to west with half the velocity with which it moves at the equator, where the degrees of the meridian are twice as wide; and consequently on our shores and in our harbours, we could not have one fourth the tide that exists on the shores in the equatorial latitudes. And as the ocean in our parallels is so narrow that the full tide could never be raised as in an ocean which has full 90 degrees of longitude in breadth, we should probably not have one sixth, perhaps not one tenth part as much tide as at the equator, if ours were produced like those, directly by attraction.

We are however so far from having so much less tides, than exist in the equatorial latitudes, that we are generally supposed to have more; in fact we have probably about as much on the whole, though owing to the figure of the land it is more unequally divided in our harbours; and we certainly have more than exists on the Atlantic in the southern temperate zone, where the ocean is so broad as to permit more elevation by attraction than can be made in our parallels.

But what seems to prove unequivocally that our tides are not produced as at the equator, that they are derivative, and that they come from a great distance, is that they are, as our authors assure, a day and a half, that is, three tides behind the cause which produced them.

That the inertia of the water, augmented by the resistance occasioned by the inequalities of the ocean, which in its effect is the same thing as inertia, should be the cause that the oscillation does not instantly obey the attraction, even at the place where the attraction is most direct, and that therefore

the water should on any particular meridian continue to rise during some minutes or even during an hour or two, after the influence of the power which elevates it had ceased to be most direct on that meridian, and that consequently the opposite influence, that which produces the ebb, begins to operate before the flood had reached its full height is what might be expected; and the necessary consequence of this must be, that there is less flood and less ebb than would exist if this inertia was less considerable.

But no inertia can be the cause, that, at the point where the tide is produced immediately by attraction, there is this day a great tide resulting from a strong attraction which existed a day and a half ago, the effect of which strong attraction has already been three times reduced to nothing by three ebbs. If therefore the syzigy, which happened a day and half past, produced our great tide of this day, the tide must have been produced so far from us, that it has been a day and half reaching us.

On another occasion we shall explain our reasons for believing that there is an error of some hours in the calculation, which supposes that our tides are thirty six hours after the attraction which produces them; but this error of a few hours, if it exist, can not affect the principle.

While observations afford strong proof of the circulation of the oscillations, this circulation will enable us to account for many phenomena ascertained by observations.

For example, it will explain why there is more tide generally, in our comparatively narrow part of the Atlantic, in the northern temperate zone, than in the southern temperate zone, where a broader ocean permits the trades, derived from the equatorial latitudes, to spread over a greater space. Owing to this same breadth of ocean, there would, on the contrary, be more tide in the southern than in the northern temperate zone, if the tides in lieu of being derived from the equatorial latitudes, were produced directly by attraction as at the equator.

This circulation of the oscillations must also have its region of calms in the centre, like the other two circulations, and in this region there can be little or no oscillation, or tides, as there is little or no horizontal movement of air or water in that region of the two horizontal circulations, of those fluids. It is then not astonishing that those who have made observations at small islands in the region of calms or even

in the broad ocean of the southern temperate zone, have frequently found little tide, sometimes only a few inches.

This circulation joined to the circulation in the horizontal movement of the water or current of the ocean, explains why the tides, in those harbours of our coast which are open to the west, are more considerable than on the opposite coast facing easterly. Thus the long point of land which makes the department of the *Manche*, the western shore of which stops the current of the tides from the west, is the cause that the Islands of Jersey, Guernsey, and the small islands near them have 28 and 30 feet tide, and quite at the bottom of the bay formed by this point, as at St. Malo, Cancale and Mount St. Michel, there is even 45 feet tide, while at the end of this cape, as at Cherbourg, the tide does not exceed 20 feet and on the east side of the cape, at La Hogue, it is only 16 feet. This current to the west is the cause that there is generally more tide on the French coast of the bay of Biscay than on the Spanish coast of the same Bay.

Though the currents in our parallels are to the west and produce great tides in our harbours which open to the west, still some degrees farther towards the trade winds, this circulation must make the current run nearly south, to join the current in the equatorial latitudes ; consequently the west coast of Spain and Portugal is almost parallel with the current and has but little tide.

This current from the west in our latitudes explains why the tide at Brest is, as our authors assure, ten minutes longer falling than it is in rising.

All that we have said on the subject of tides is in some sense a digression from our principal subject. We have indulged in it on account of the similarity there is in these movements of the atmosphere and the ocean.

It seems certain that there exists a treble circulation, that of the oscillations of the tides of the ocean, that of the horizontal movement of the air of the trades, and that of a similar movement of the water of the ocean.

All these circulations or currents take their direction from east to west across the Atlantic in the equatorial latitudes: they are all stopped at the continent of America, and there turn north and north east along the coast of America, then east across the Atlantic, and afterwards south east and south into the current of the circulation in the equatorial latitudes. These circulations are so perfectly the same that it would be more correct to call them but one circulation, and the ra-

ther as it is obvious that every cause which tends to produce the tides, and the consequent current in the ocean, must equally affect the atmosphere, which is, as to the effects of attraction, but the surface of the ocean, and they therefore form in this respect but one mass of fluid.

Section 8. *Cause of the Trade winds.*—The attractions of the stars and principally of the sun and moon are so obviously the cause of the oscillations or tides in the ocean, and directly or indirectly the cause of their movement from east to west in the equatorial latitudes, that it is impossible to mistake it, and it is difficult to believe that the same cause is not common to the other movements and particularly to that of the atmosphere in the region of the trades.

Our Geometers however deny this. They say they have demonstrated by analysis, that the attraction of the sun or moon can have no sensible effect in producing the trade winds or the currents in the ocean.

It is however believed that these demonstrations have gone no farther than to prove that the influence which the attraction of the sun or moon can have, by soliciting the particles of air in an horizontal direction, is small, and must be so nearly equal in the two opposite directions that no sensible effect can result from it.

If this is indeed all that these analytic demonstrations have proved, the sole surprise they can occasion must be, that it could be supposed that any analysis could make this truth more certain or the evidence more clear; and the sole error with which they can be reproached is, that according to some Geometers at least, they give for result that this attraction may in this manner have a little tendency to produce an horizontal movement from east to west, but so little as to be insensible, while without any analysis, it is evident that this influence must be rigorously nothing.

If the globe was wholly fluid, or if it was enveloped in a fluid to a considerable height above the surface, and if it moved in its orbit without turning on its axis and uninfluenced by any celestial body except the sun, round which it moves, every particle of the fluid would be influenced by its own gravitation, by the attraction of the sun, and by that centrifugal force which keeps the globe in its orbit.

The globe, or the fluid in which it is enveloped would, in that case, take such figure, in consequence of this combination of forces, that every particle would be at rest in its equilibrium, that is, every particle would be at rest, relatively to

the earth, and relatively to the figure of the whole fluid of which it was a part. The attraction of the sun could not draw a single particle from east to west, nor displace it in any other direction; for the whole attraction on each particle would be absorbed or employed, to keep the particle in its equilibrium, by the result of the influence of all the forces.

If the solid parts of the earth turned on its own axis, and the fluid, which enveloped it, did not turn, but remained fixed as in the last supposition, each particle would still be immoveable, relatively to the whole figure of the fluid of which it was a part, and relatively to every other particle of the fluid. This attraction could not then displace any particle, because the whole attraction like the whole of the other forces is necessary to maintain the fluid in its figure. But if the figure of the fluid was such that the fluid was higher above the surface of the earth in some places than in others, as would be the case, then there would be oscillations, which relatively to the different meridians of the earth, would move with the velocity with which the surface of the earth moved, and there would be an horizontal movement of the fluid over the earth with the same velocity, each particle of the fluid keeping its place, relatively to each other particle.

If the whole globe, including the fluid which enveloped it, turned on its axis, the figure of the fluid, in its different parts, would be successively formed by particles in movement; still the figure viewed from the sun, would remain as fixed as if the fluid did not turn on its axis of the globe, and the attraction of the sun could no more change this figure by displacing a particle, than if the fluid did not turn on the axis of the globe.

Thus in all possible suppositions, the figure of the fluid being the result of the influence of the several powers on the particles of the fluid, this figure will remain the same so long as their influence is the same; consequently the effect of any one of these powers, by soliciting any particle from its place in this figure, is perfectly null, the whole of each power being employed to form the figure and to keep each particle in the place necessary to this formation.

But though we believe with the Geometers, that the attraction of the sun cannot produce the trade winds *by soliciting the particles of air from east to west*, still we believe that the attraction of the stars, and principally of the sun and moon, is the cause of the tides and of similar elevations or oscillations in the atmosphere, and that these oscillations together with others, of which we shall speak hereafter, and

their movement from east to west do necessarily produce an horizontal movement of the fluid in the same direction, and are the cause of trade winds and of a current in the ocean, in the same parallels, and consequently of the circulations we have described in these fluids.

The astronomers however attribute this current of the trade winds to a very different circulation, one which has its plane exactly perpendicular to that of the circulation of the air which we have described.

They say that the trade winds are occasioned by the greater density of the air near the poles and a constant rarefaction at the equator, by which the air at the equator rises to a greater height, whence it falls by its own gravity back towards the poles, and thereby creates a circulation of air which moves from the polar latitudes towards the equator near the earth, and from the equator towards the poles in the higher regions.

This current of air near the earth being forced from the polar latitudes, by the weight of the current arrived by the upper regions, departs from the higher latitudes with a slow movement of rotation, that is, a movement from west to east, common to the earth and atmosphere, slower than that of the surface of the earth at the equator, in proportion as the meridians at the latitudes whence this air comes, are narrower than those at the equator: therefore says this theory, when this air arrives near the equator, with its slow movement of rotation, it is on parallels where the surface of the earth moves so much swifter than this air, that every thing fixed on the earth passes by the air, strikes against it, and gives it the appearance of a movement in the opposite direction ; which is that of the trade winds.

This is the theory of the first Geometers in the world, inserted in the books which serve as the text of the professors in our greatest schools.

Without the aid of more explanations than have been given by the authors and teachers of this theory, the existence of this supposed circulation and the presumed currents in the upper regions of the atmosphere in directions opposite to the current near the earth, will be very difficultly reconciled with the principles of physics and mechanics.

But if it were possible to explain the existence of such a circulation consistently with those principles, still the very important objection remains, that there is not a single observation cited as proof that such circulation exists.

We do indeed sometimes, but rarely, see the clouds in the higher regions move, during a short time in a direction different from and even opposite to the course of the wind near the earth. But this is so far from being the general appearance, that whenever we see it, we always predict an approaching change in the wind, and this change never fails to happen within a few hours, and generally within a few minutes. Sometimes indeed this change takes place in the current above, but more generally in that near the earth, but they never fail both to take the same direction within a very short time.

That we sometimes see distinctly the rare phenomenon of these opposite currents is so far from a proof that they exist habitually like the trades, that it is rather a proof that if they did exist habitually, we should see them frequently; for if these opposite currents were the usual course in the air, the appearance of them, very far from assuring us a sudden change in the wind, would, on the contrary, be a strong indication that the air was in its settled habitual course, and consequently not likely soon to change its direction.

If any such circulation could exist, the air in the upper region must move very slow on account of the little height to which the rarefaction could elevate the air above the surrounding atmosphere, and consequently much more than half the air of our atmosphere must be in the upper current, but if no more than half the atmosphere were in this supposed upper current, still all the air, which is more than 5 or 6000 yards above the earth, must move in a direction opposite to the wind on the earth, and consequently many clouds in that current would be constantly seen; and the rather as this theory supposes, contrary indeed to probability, that this upper current is moving towards the poles, because the air in it is *warmer* than in the current next the earth, and if so, there must be more clouds visible in that current than in the upper parts of the lower current, since the warmer air sustains more water.

But if we cannot distinguish the upper currents, at least we can see the lower currents, those in which we live, and we see no such thing.

How far the advocates of this theory suppose their circulation may extend towards the poles, they do not say, but to make it answer their purpose of producing the trade winds by the slow movement of rotation, which the air of the under current has, it seems that they must suppose that the circulation extends at least some distance into the temperate zone,

and that consequently an habitual wind must exist over a good part of the temperate zone towards the equator, which is very opposite to what we see, for the winds on the Atlantic in that zone are generally from the west, seldom from the north, and next to the region of the trades there is a considerable region of calms, across which there is no current; thus however it may be as to the upper current of this theory, the lower current does not exist, unless they would limit their circulation to parallels between the two regions of calms.

If this circulation is supposed to be limited in this manner, it cannot extend much beyond the tropics, perhaps even sometimes not so far; consequently it will be difficult to obtain the slow movement of rotation, which they suppose causes the trade winds. This will be a difficulty at all seasons of the year, and at the time of the solstices a further difficulty will be, that the air arrived from the trades by the upper region must be cooled exactly on the parallels to which the sun is vertical, and then sent from those hot parallels, to 10, 12 or more degrees distant to the region of the trades, to be rarefied so as to rise; for it must be remembered that during more than half the year, the region of the principal force of the trades is at several degrees distance from the parallels to which the sun is vertical.

One difficulty among a multitude of others, must be to conceive how the slow movement of rotation, which the air from towards the poles is supposed to have, when it arrives at the region of the trades, can form the kind of curb expressed by the current of air as we see it.

One would expect that air departing from the higher latitudes, with a slow motion of rotation, would fall to the westward more rapidly on its first departure, than after it had received many impulsions from the objects which passed it in its course, impulsions which in time would give it as much movement of rotation as the objects which strike it; and consequently the nearer this air advanced to the equator, the less westerly direction it ought to have; while on the contrary it seems to have no westerly direction till it is on the very borders of the trades, and then in the parts near the coast of Africa it inclines obliquely to the west; but towards the coast of America there is almost no sensible border of the trades in which the wind comes into them in an oblique direction; it blows almost west on the very outside of the trades, so that if the air has come there from the polar regions with a slow movement of rotation, it has not fallen off to the west during its passage, but on its arrival it makes an almost

right angle to the west exactly at that period of its passage when it ought to have gained most movement of rotation, and consequently ought to have had least tendency towards the west.

Indeed the supposed vertical circulation of the air, introduced to account for the trade winds, is so far from producing the horizontal movement of the trades that they are inconsistent with each other; and if two bodies of air in these two movements, that is, one with the horizontal movement of the trades and the other the vertical circulation supposed to produce the trades, could be brought into the same region, they would immediately interrupt and soon totally destroy each other.

If, as we believe, all, or nearly all the variable winds, in our climates, depend on the course of the trades and on the varieties in the force of them, it is important to ascertain exactly the cause of them, as the only means of foreseeing the varieties which will happen in them, and the effects which those varieties will produce on our variable winds.

It has already been said, that the several circulations in the atmosphere and the ocean, which we have described, so nearly resemble each other that there can scarcely remain a doubt, but that they depend directly or indirectly on the same cause, and that one of these circulations, that of the oscillations or tides of the ocean, visibly depends on the attraction of the stars and particularly of the sun and moon.

As to the manner in which these oscillations are produced by this attraction, we will speak more particularly of it in another place; it is enough for our present purpose that they exist, and that in the equatorial latitudes they move from east to west, with the same velocity with which the earth turns on its axis, or rather with the same velocity with which any particular meridian moves relatively to the body whose attraction produces the oscillation. This we see in the ocean, and the same must exist in the atmosphere, in a much greater degree; for the atmosphere surrounding the whole earth is not impeded in its movement by the continents, nor by the inequalities in the depth of the ocean, nor the irregularities of the shores, which resist the movement of the water of the ocean. We see also an horizontal movement of the atmosphere in the trade winds in the same direction in which the oscillations move, and this, we think, results necessarily from the movement of the oscillations.

When any particular meridian, ours of Paris for example, has full tide, the opposite side of the globe, that of our

antipodes, has also full tide; while the two intermediate parts have ebb, the two ebbs being greatest at 90 degrees from us on each side. While the ocean or the atmosphere remains in this state, the two quarters of the globe on which we and our antipodes are placed, have more of the fluid which surrounds the globe than there is on the two intermediate quarters, where there is ebb. But six hours after our full tide, we and our antipodes have low tide, and the two intermediate quarters have full tide; that is, we and our antipodes during these six hours have come to have less water and less air on the quarters we and they inhabit; while the two intermediate quarters have more than they had six hours before, by the whole difference between full tide and low tide. It is then visible to the most superficial observer, that a quantity of the fluid, equal to all that was elevated in the oscillation, or equal to all the difference between full tide and low tide, has moved horizontally from one quarter of the globe to the other, that is, this quantity of fluid has moved over 90 degrees of the meridian in six hours, and this horizontal movement has been produced by the movement of the oscillations.

Certainly, no one particle of the atmosphere has moved with a velocity so astonishing as that of 90 degrees in six hours; but the mean velocity of the whole fluid, contributing to the removal of the quantity elevated in the oscillation, must have been in proportion to the velocity with which the oscillation moved (90 degrees in six hours) as the quantity elevated in the oscillation, is to the whole quantity of fluid contributing to the movement.

It may perhaps seem that the quantity of fluid, elevated in these oscillations, cannot be so considerable as to produce a mean movement in the atmosphere of the equatorial latitudes equal to the current of the trade winds, and this idea may seem to be countenanced by what we shall say when we come to consider the manner the oscillations in the ocean and in the atmosphere are produced by the attraction of the stars; for it may perhaps then seem, that the quantity of fluid contained in those oscillations is not by far so considerable as has been sometimes supposed, by those who formed their opinion from the elevation of the tides they see in our harbours, an elevation in the greatest part produced by the resistance which the land opposes to the current of the ocean. We even believe that this quantity elevated is less than would result from calculations founded on the received theory of the tides.

On the other hand, the oscillations made by attraction are not the only cause of these winds, for the oscillations produced by rarefaction by the heat of the sun or by condensation, moving just as quick as those produced by attraction, must have equal effect in proportion to the quantity of fluid elevated.

It must also be remembered that a great part of the air between the two regions of calms contributes very little to the movement of the air of the trades from east to west, for in some parts of this region there is but little movement, in other parts the movement is more or less oblique to the equator, and in some parts the movement is interrupted by variable winds. It is also to be remarked that though the trade wind is so constant as to be a very characterised wind, it is however not generally a strong wind, as is obvious by the interruptions it meets at every little island, from the feeble sea and land breezes.

Add to this, that as the trade winds are but one side of a circulation, or rather the centre of a double circulation, which is in constant movement by a cause constantly operating, it will occur to every one acquainted with physics, that the movement must be accelerated by this constantly operating force, beyond the velocity given by the first impulse. This acceleration can never be rigorously calculated, because the value of the resistances can never be known.

It has already been mentioned that the circulation in the ocean differed from that in the atmosphere, in two respects, one of which differences was explained, but the most remarkable of the two, is, that the movement of the air of the trade winds is much more rapid, than that of the waters of the ocean, on the same parallels.

It seems probable that this is due to this accelerated velocity of the air, an acceleration which can take place in the water to only a very small degree, if at all, on account of the resistances it meets by the inequalities of the earth at the bottom of the ocean and the irregularities of the shores, all which oppose so much resistance to the movement impressed on the water in the equatorial latitudes as to reduce the velocity of the movement in that region to little more than in proportion to the velocity with which the oscillation moves, as the quantity of water elevated in the tide is to the whole water which contributes to the movement.

It is however of little importance to our subject, what the circumstances may be, which affect this current more or less, for if it is certain that the current is produced by the move-

ment of the oscillations, *the principal force of the trades must be where the oscillations are most considerable, and the trades must be strongest when the oscillations are most considerable, and weakest when those oscillations are least considerable.* These are all the inferences from this theory, which can be of any importance to our enquiry into the effects which the varieties in the trades may produce on our variable winds.

It has been said that there are oscillations of different kinds, the combination of which produces the trade winds, and it is from the different combinations of the influence of these several oscillations, and their movement, that the differences proceed in the force of these winds and in the regions in which they blow.

A great part, probably much the greatest part, of these oscillations is produced by the same influences which produce the tides in the ocean.

If these were the only oscillations on which the trades depended, the region of their principal force would always be at the equator, though the sun and moon, which cause these oscillations, are sometimes north and sometimes south of that line.

It is true that when the sun is at the northern tropic, it produces an oscillation, a full tide, by attraction at that tropic, on the meridian to which it is vertical; but on the opposite side of the globe, the full tide produced at the same time by the influence of the sun, is produced at the southern tropic. So in all cases where either sun or moon is vertical to a parallel at some distance from the equator, they produce one oscillation or full tide on the parallel to which they are vertical, and the other on a parallel equally distant from the equator in the other hemisphere.

And while the two elevations are produced in this manner, on opposite sides of the equator, and at equal distances from that line, the ebb or greater diminution of height between these two full tides, being always in the horizon of the star, is on the equator itself, as much as when the star is in the plane of the equator.

The removal of the sun or moon from the equator towards the tropic, may then tend to enlarge the zone in which the trade winds blow, and may probably thereby weaken their force, but the centre of their region is not thereby removed towards the north or the south.

But in the combination of causes which produce the trade winds, the oscillations caused by rarefaction or condensation moving from east to west with as much velocity as the others

have an influence, in proportion to the quantity of air contained in them; and these oscillations, caused by rarefaction and condensation, are not, like the others, produced on eac h side of the equator, when the sun which causes them is at a distance from that line, but are produced on the parallels to which the sun is vertical.

What proportions these oscillations, caused by rarefaction and condensation, bear to the others, in the general combination which produces the trades, is quite unknown. The whole influence has been ascribed to rarefaction by many persons, and much too great a portion of influence has been generally attributed to it. Whatever removal there is of the region of the trades, from the equator towards the tropic at the time of the solstice, is probably wholly due to this cause: while on the one hand, a principal motive, for wishing to ascertain the proportion of influence produced by rarefaction, is to ascertain what removal of the region of the trades takes place; on the other hand, one of the readiest ways to ascertain this proportion is by observations made on the removal itself of the trades and of the two regions of calms by which it is bounded. All we know on this subject is, that seamen seem to agree that the regions of the calms and of the trades are farther north at the summer solstice, than at that of the winter, and that consequently when the sun is at a distance from the equator, the centre and principal force of the trades are on some parallel between the equator and the parallel to which the sun is vertical.

There seems to be no method to ascertain the extent of these changes in the region of the trades unless by observations; but as they probably all depend on the position of the sun, relatively to the earth, we may hope that when accurately observed they will be found to be governed by very simple laws.

As to the variations in the force of the trades, there can be but little doubt they depend principally on the position of the sun and moon relatively to the earth, and that those winds may be expected to be strong, when those two bodies are vertical to the same parallel, and particularly if they are at the same time vertical to the equator, or to some parallel very near that line, so that the oscillations on the two opposite sides of the globe follow each other on the same parallels. They will be strong at the syzigies, and more feeble at the quadratures. Other things being equal, they will be stronger at the perigee of the moon than at the apogee; and stronger at the perihelion than at the aphelion of the earth;

stronger when the oscillations made by rarefaction or condensation coincide with those made by attraction, than when the flood of one falls at the ebb of the other.

The greater part of these differences in force seem to be of a nature to be submitted to calculation, and the others seem such that we may hope that accurate and repeated observations may give us the knowledge of their laws.

It is very probable that these are not the only causes on which strong and weak trades depend, but if they should be found to be the principal causes, we shall seem to have already some elements for deciding whether the trades will be strong or weak, and consequently whether the equinoctial gales will be violent or feeble at any particular equinox, as well as whether these gales will happen before or after the equinox.

The much more difficult point is, to shew the consequences of these varieties, on our variable winds.

SECTION 9. *Variable winds.*—We have endeavoured to show that our prevailing winds depend on the circulation of the air of the trade winds. To ascertain the nature and cause of this circulation, we have shewn that there exists also in the same region, a circulation of the waters of the ocean, and another of the oscillations of the tides, which resemble so exactly the circulation of the air, that there scarcely can be a doubt that they all depend more or less on the same cause. We have also remarked that in consequence of our position in the region of this circulation, our prevailing winds are from the westward.

If the theory we have attempted to explain is accurate, these winds result so necessarily from the circulation of the air of the trades, that if this circulation was not to be interrupted, we should have no other winds; and the interruption of this circulation necessarily deprives us of them.

We have shown that this circulation is very little liable to interruption, except at the coast of America in the equatorial or tropical latitudes, where the course of the trades is stoped by that continent; and that no interruption occurs even at this point, which can affect the winds on our coast, except that the air of the trades is there sometimes drawn out of our northern circulation. This happens in two ways; first, when the air of the trades, in lieu of being stopped by the continent of America, goes across the land into the South sea; secondly, when, at the same point, the whole or an unusual proportion of it goes into the southern circulation.

When either of these events happens, all the coast of Eu-

rope has north or east winds, which, after those from the westward, are our most prevailing winds. These north and east winds usually terminate with us by a southerly wind, which however is seldom of long duration.

Thus while the circulation of the air of the trades is uninterrupted, we have winds from the westward; when this air is drawn out of our northern circulation, we have north or east winds; and when the air of the trades comes again into the usual circulation, our north and east winds become for a short time southerly; and then the winds from the westward return.

But—*What are the circumstances which draw the air of the trades out of our circulation?*

If we could answer this question accurately, we should seem to have all necessary data for calculating most of our variable winds, and for ascertaining what our future seasons are to be.

If the continent of America opposed no resistance to the course of the trades, the air would continue its westerly direction across the land, and thence across the Pacific ocean.

If the resistance opposed to the course of the trades by the continent of America was in all parts and at all times the same, and if the trades arrived uniformly, and in the same force, they (meeting always the same resistance) would always take exactly the same direction;—we should then have none of the interruptions in the circulation which occasion our variable winds.

But some parts of the continent undoubtedly oppose more and others less resistance to the course of the trades; and the trades arrive sometimes in greater force than at others, and consequently are not equally stopped by the same resistance; sometimes the principal force of them arrives at one point, and sometimes at another.

There are probably some parts of the continent, on which a feeble trade may be stopped at its first arrival, and by the figure of the land be carried into the northern or southern circulation; when at the very same point, a stronger trade may not be stopped till it reaches many leagues farther in land; where, by a different form of the land, it may be turned in an opposite direction from what it would have taken, if it had been so feeble as to have been stopped farther eastward.

These and probably many other circumstances tend to create great variety in the proportion and quantity of the air of

the trades which comes into our circulation, and consequently to produce great variety in the circulation itself, and in our variable winds which result from it. But as the different degrees of force in the trades, and the variations in the region of their principal force, seem to depend almost wholly on the position of the earth relatively to the sun and the planets, it seems very probable that we may one day be able to say, that—"on such a day the principal force of the trade "will arrive at the continent of America, in such a parallel "of latitude, and it will be a strong or a weak trade."

Nor does there seem to be any impossibility that men at some future day should be able to go farther, and say,—"the "trade on such a day will be strong, and as the principal "force will arrive on such a parallel, the air will go across "the land, or will be turned into the northern or into the "southern circulation."

If it were possible to get this information, we could probably calculate with some confidence the course of many, perhaps of most, of our winds; but this would be far short of completing the science; for, though the causes of which we have been speaking may be nearly the whole which affect directly the course of the air in the great region of the circulation in which we are placed, still this region is in contact with other great regions of air, which also have their circulations, their interruptions, and their variable winds.—Whenever, owing to any of the causes which affect the circulation in the neighbouring regions, the equilibrium is destroyed, particularly if destroyed in the parts near the region of our circulation, the air of our region is immediately affected; and for this reason, in all the extremities of our great double circulation, in all those parts near the other regions, the winds are more variable than near the centre of our circulation, and are governed by more complicated laws.

But if we could accurately calculate the effects of the several causes which affect directly the circulation in our own region, we should probably find many of those causes so far common to neighbouring regions, as to aid us in finding the laws by which the movements of air in them also are governed. To make the very first step in these inquiries, we must begin by obtaining accurate observations on the resistance opposed to the passage of the trades by the different islands and different parts of the continent of America, and on the effect these resistances produce on trades of different forces; and to render these observations in any considerable degree complete, they ought to be attended with observations on the

state of the air at the time, on the west coast of America, contiguous to the neighbouring circulation of the great Pacific ocean.

As the variation in the force of the trades, and the movement of the region of their principal force, seems to be the cause of most of our variable winds, it is important to observe accurately where this region of principal force is at different times.

We want also observations which may in some degree ascertain the height to which different powers, particularly the attraction of the sun and moon, do raise the atmosphere in different parts and under the different circumstances of the perihelion or aphelion of the earth and the perigee or apogee of the moon; and others to ascertain the actual velocities produced in the trades by different combinations of the several causes of those winds.

On some future occasion an attempt will be made to explain the manner in which the attraction of the sun and the planets tends to produce the trade winds.

SKETCHES *relative to the Natural History of the* BLOOD, *and a Theory of* GOUT; *communicated by* JOHN BRICKELL, M. D. *of Savannah, to Dr.* MITCHILL.

SIR,

[" *I send you a little essay relative to the blood; and add to it a few remarks on Gout, that have succeeded well in practice. Most of the first part I got from Sir Charles Blagden, M. D. who was extremely kind to me in promoting my medical studies. I have been grieved to hear of the death of this most amiable, ingenious, and learned man; and fearing that he omitted giving his experiments on the blood to the world, and thinking the subject valuable, I have arranged it for our use in America.*]

1. Atmospheric air, on entering the lungs of a living person, in the act of respiration, imparts to the blood a portion of its oxygen gas or vital air. The blood, thus impregnated, returns to the heart, stimulates the left ventricle, from whence, by the power of its contraction, it is impelled into the aorta to be distributed throughout the system.

2. If air cannot enter the lungs (as in case of the head being under water, or a tight ligature round the neck, the head closely confined in a bladder, or the animal being *in vacuo*,) the blood is no longer impregnated with oxygen gas, the

true Promethean fire; the action of the systole ceases, and the circulation of the blood is suspended. This circumstance, long known, is handsomely illustrated by the ingenious and scientific experiments of Doctor Goodwin.

3. The heart, in its vital action, propels the blood through the arteries to the brain, and to all the other parts of our system, furnishing them with materials which, by complicated modifications and combinations, yield nourishment, secretions, &c.; and the brain distributes, by the mediation of the nerves, its peculiar influence to many parts of the human frame, adjusting their operations; without which, the instruments of voluntary and involuntary motion, as well as the organs of sensation, would act imperfectly.

4. The brain, however, does not exert a primary agency upon the left ventricle of the heart: for the action of the systole ceases unless it be stimulated by oxygen gas. (2.)

5. The blood is a material of great importance in the human machine; the vital principle, or capacity of being restored to life, has seldom remained longer than six or eight hours after the cessation of its motion; though, upon some rare occasions, (in trance, &c.) persons have revived, even without apparent aid, after the circulation has been more than twice that length of time suspended.

6. With the evidence of this fact, therefore, of life having, as it were, spontaneously returned after so long a seeming absence; and having reason to conclude that it might have been sooner recalled by a zealous application of suitable remedies; we are encouraged to persevere in our exertions to recover persons drowned, or who seemingly perish by gases, lightning, temporary debility, passions, &c. or children still-born, or affected with eclampsia, &c. until tumefaction of the abdomen, the evolution of putrid effluvia, or other circumstances, exhibit conclusive signs of death.

7. So much of the nature of the blood, therefore, as may usefully relate to the subject of our present enquiry, will be noticed in this place, viz. its gravity, mechanical structure, chemical properties, and how its motion may be retarded or accelerated, restrained or facilitated, by increasing or diminishing the bulk or diameter of the blood-globule, while it circulates in the sanguiferous vessels.

We will commence this enquiry by ascertaining the effects produced upon the circulation of the blood by its own gravity.

9. The solution of this problem resting upon mathematical properties, which may be seen in the Principia of Sir Isaac Newton, *Lib.* 1, *de legibus motus*, it will be unnecessary

to repeat them here; their application therefore will only be given.

10. If a living human body be placed in the horizontal line, A B, the force of the blood's motion, or its horizontal momentum, neither retarded nor accelerated by gravity, must be simply as the impelling force, or as the power of the systole: making allowance for arterial elasticity, and the vis inertiæ of the fluid.

11. If the body be placed in the perpendicular, C Z, (the head directed to the zenith) the momentum of the ascending blood will be resisted by the gravity of its column. If v=its horizontal force, and g=its gravity, then its perpendicular ascending momentum=v—g; and for the same reason, its perpendicular descending force, in CN,=v+g; the difference, therefore, between the perpendicular ascending and descending force of the same column of blood, is double its gravity.

12. If a column of blood ascends obliquely as in the line CD, its gravity will be denoted by *n*, the sine of its ascending angle; its ascending momentum in this case=v—n; and if it descends in an equal angle, as in the line CE, its descending force=v+n.

13. Hence a column of blood moves with greater force in any direction below than above the horizon.

14. Hence in headach, ophthalmia, &c. arising from the force of the blood impinging against the brain, &c. the greatest relief derivable from position will be had by directing the head to the zenith, as producing the least quantity of impulse; the greatest pain will ensue on directing the head to the nadir; and the mechanical cause of pain will be *plus* or *minus*, as the sine of the ascending or descending angle of the blood's motion.

15. Hence, the pain of a sore leg, wounded limb, or of any inflamed or irritated part, is greatest when it swings; less when placed horizontally; and farther diminished when elevated above the horizon, provided the muscles and integuments, attached to the part, be relaxed.

16. Hence the power of gravity may be applied to aid in retarding or accelerating the velocity of the blood, by fixing a cot or bed to swing upon a central axis (as a tilting cart), ad-

mitting of either end being elevated or depressed by cords to any required angle.

17. Such an apparatus would be useful in certain cases of difficult parturition, when it is necessary to replace the infant in a position more favourable for delivery.

18. If we inspect the transverse position of the intercostal and some other blood-vessels, it must be manifest that the circulation in them, whether too swift or too slow, may be either retarded or accelerated by turning the body on one side or the other occasionally.

19. We will now touch upon some other particulars relative to the blood. This fluid appears red and homogeneous in the blood-vessels, but is in reality a mixture of red and pale parts, viz. of globules intermixed with a whey-coloured fluid consisting of lymph, chyle, &c. from which the fibrina, or nourishing material, is principally formed.

20. The lymph, while in its own diaphanous vessels, is pale, and has sometimes a moniliform appearance. Its consistence varies; its motion is generally progressive till it enters the blood; though it is sometimes retrograde, in obedience to pressure, stimulus, or capillary attraction, flowing to relieve, occasionally, with its balm, such parts as are over stimulated by mechanical force or chemical action.

21. The globuli of blood are of different sizes in different classes of animals. In man they have not always the same diameter: their bulk being diminished by the contact of water or oxygen gas, but increased by that of azote, and some other things.

22. In the amphibia, the globule is smaller than in fishes, but larger than in birds or quadrupeds; in man it is still smaller.

23. The diameter of the anastomosis in man is *variable*, an effect simply *nervous;* and the sudoriferous, as well as some other minute vessels of the system, are subject to the same law. We sometimes observe a passage refused to the globule from the artery into the vein, through the minute vessels of the extremities, (in ague) and to the perspiration through the cuticular vessels, which have passed freely through them a few minutes before and after.

24. The blood globule is spherical and elastic; it consists of a red central spherule, surrounded by a whey-coloured involucrum of fibrina. The whole resembling the yolk and albumen of an egg.

25. The globuli pass singly from the artery into the vein, through the anastomosis. They are retarded at its en-

trance, elongate themselves into a form somewhat cylindro-elliptic, and, when sufficiently attenuated, pass through into the vein, instantly resuming their former spherical figure: which shews their diameter to exceed that of the anastomosis.

26. In the blood-vessels are found various acids, as well as fixed and volatile alkali, some combined, others not. The blood-globule being formed in the midst of these saline materials, accounts for its difficult solution in fluids containing neutral salts, though easily soluble in simple water; for the contact of this fluid dissolves the albuminous coat of fibrina, which invests the central spherule as the albumen surrounds the yolk of an egg.

27. If water be brought cautiously into contact with the globule, so as to dissolve one side of the albumen, the central spherule may sometimes be seen to tumble from the remaining calyciform part, (like an over-ripe acorn from its calyx) upon reclining the field of the microscope. The writer had the gratification of seeing this delicate experiment successfully performed by Doctor Sir Charles Blagden near thirty years ago.

28. Hence, water, by diminishing the size or bulk of the globules, facilitates their transit through the extreme vessels, diminishes febrile action and re-action, and on some occasions becomes a febrifuge. (26.)

29. In some stages of fever, a draught of water taken cold or warm, is occasionally succeeded by free perspiration, the contents of which being similar to certain things found in the blood, shew the water to have brought them from the blood to the surface of the skin; and the facilitated circulation, shewing the diminished bulk of the globules, proves their diminution to have been effected by the water during its visit to the blood. (28.)

30. Persons unable to swallow, from wounds or other causes, have been nourished by baths of milk, broths, &c.; and injections of similar materials have had a like effect.

31. Hence, fluids pass from the blood to the surface of the skin (29) and from the surface of the skin to the blood. (30.)

32. Hence, baths and injections of water, warm or cold, are occasionally febrifuge, especially when the circulation of the blood is to be facilitated. (28.)

33. Hence, people at sea, destitute of fresh water, have their thirst mitigated by washing any part of the skin in salt water. (31.)

34. Hence, as nourishment may be conveyed from the skin to the blood, without passing through the stomach, it follows that the gastric juice is not absolutely necessary for preparing certain kinds of food.

35. The formation of the central spherule, or nucleus of the blood-globule, is a phenomenon not a little curious and interesting to the medical philosopher. Iron is sometimes found of a red colour in the earth. This metal exists in many things which we eat and drink; is capable of being held in solution by any of the acids in our system, and of being conveyed in this state, from the stomach, along with the chyle, into the blood.

36. In passing through the lungs it is turned to a scarlet colour by the oxygen of the inhaled air, and afterwards to a deep red, or purple, by the chemical agency of things which it meets in the circulation.

37. The azote, separated from the oxygen in the lungs, acting upon the lymph, chyle, &c. forms the fibrina, or albumen; thus both parts of the atmosphere are employed in forming both parts of the globule of blood. If the quantity of azote exceed the proportion of the oxygen, it forms a greater proportion of fibrina, and the globule will be the larger; but if the oxygen exceed in quantity, the globules, for the same reason, become the smaller. When therefore the motion of the blood is to be facilitated, or accelerated, the globuli are to be diminished in size by giving oxygen gas; when their motion is to be retarded or restrained, the size of the globules is to be augmented by azote.

38. The central spherule, containing *iron*, has more specific gravity, and consequently a stronger attractile force than things of greater levity in its neighbourhood: it therefore becomes a nucleus, attracting to itself an albuminous coat of fibrina from among them.

39. The superior density of the red part of the blood is evident, from its being found at the bottom of blood drawn out in venesection, after a separation of its parts has taken place.

40. Hence, when the circulation is to be excited or facilitated, as in persons drowned, asthmatic, affected by lightning, gases, eclampsia, apoplexy, &c. it is proper to throw oxygen gas into the lungs, (37) or water liberally into the system, by the mouth, anus, and skin (29); and, when the impetus of the circulation is to be diminished, or its velocity to be retarded, as in pulmonary or other species of hæmorrhage, &c. we are to apply azote, and keep the patient from water. (37.)

41. Hence, the warmth and circulation restored to the feet of Doctor Thornton's London patient on taking oxygen gas, after they had continued obstinately cold and without circulation for a length of time.

42. Hence, Doctor Beddoes slept equally warm under fewer blankets than usual, after taking oxygen-gas at going to bed: the facilitated circulation diffusing warmth throughout the system, especially the extremities.

43. Azote and carbonic acid are found, with other things, in putrid effluvia. These effluvia vitiate the air in cities, prisons, hospitals, &c. not kept clean; in ships not well ventilated; and where carrion, &c. are suffered to remain. Their pernicious effects on the human body, as well as their being the parent of yellow fever, &c. are fatally experienced.

44. Some of the windows and doors in prisons and hospitals might extend from the floor to the ceiling, to permit the free escape of pernicious gases both light and ponderous; a few auger holes made through the floors, in the corners of the rooms, would favour the same object; and, for the purposes of complete ventilation, &c. it might be well to have the partitions of sail cloth, to be put up or taken down like curtains, and washed occasionally.

45. We may here remark the impolicy of building the houses of our cities in contact, which contributes to vitiate the air by restraining its free circulation. Air is indeed the best and cheapest of scavengers, for dispelling putrid effluvia from our cities, &c.

46. We have noticed (35) that iron is carried into the blood by an acid formed in the stomach, intestines, &c. This acid material, which varies in strength and quantity, is heterogeneous, consisting of a variety of acids. The alkali of the bile, which it often meets in the stomach, and almost always in the duodenum and other intestines, diminishes its quantity and power, forming with it a useful saline compound which stimulates the intestines to extrude the feces.

47. When the quantity or concentration of this acid is too great, it is easily subdued by a small quantity of fixed alkali taken frequently in water, until the effect is produced; but if the acid should escape into the blood, and enter the ultimate vessels, it is sometimes capable of decomposing the bones.

(47.) Take two to ten grains of salt of tartar in two or four ounces of water every 15 or 20 minutes till relieved.

48. In the act of decomposition, the parts of the bone necessarily recede from each other, and occupy a larger space, (see Locke on vacuum) thereby distending and exciting in-

flammation in the periosteum, &c. This is the pain of *gout.*

49. The alkali, (47) sent in pursuit of this pernicious agent, having a stronger attraction for it than the bone has, suspends its operation, and forms with it a neutral salt, which being soluble in water, is easily carried out of the body. The fixed alkali, however, being capable of decomposing the teeth, they ought to be well washed with water, to wash off any salt that may remain upon them, after taking it. Lime, although it neutralizes most of these acids, forms stone with some of them, which being insoluble in water, cannot be so easily expelled out of our system. The stones found in the bladder, kidneys, lungs, salivary ducts, and other places, admonish gouty valetudinarians of the danger of visiting calcareous springs, or of using calcareous waters.

The writer feels a hope, that from the resources presented by water and air in the cure of diseases, many of the nauseous drugs, now in use, may be laid aside.

Remarks on the MANNERS *of the* INDIANS *living high up the Missouri: Translated from a manuscript of* JEAN BAPTISTE TRUDEAU, *put into the possession of Dr. Mitchill, by* Mr. NICHOLAS BOILVIN.

ALL these barbarous people are ignorant of subordination and obedience. They live in a sort of equality taught them by nature. They have no regular laws, judges, nor priests. Their regulations are not so intricate as to entangle the poor or the unwary.

It is one of their customs to furnish each other with food and necessary utensils. They are continually making presents to each other, either of horses or other articles of value to them. They are very particular to assist each other in distress, and they have no desire to accumulate property. To be rich, never enters into the calculations of any of them. To gain consideration among these people, a man must be courageous, warlike, generous and active. As their property is small, they have no remarkable disputes grounded on their relations to it, and consequently civil and criminal prosecutions seldom happen. Slander and cheating are also very rare. If any thing of this sort happen, the guilty person is punished by being told that he is deficient in understanding, or has a bad heart. And if a theft is committed, it is

very generally excused by saying that the offender must have been in extreme necessity.

There are very few instances of their taking each other's goods, although their huts are open night and day, and any person enters freely at all hours. And murders and assassinations are less frequent than would probably happen under similar circumstances, among a people possessing a keener appetite for property. If these nations, to which we apply the epithet of savage, knew as well as we do ourselves, the dispositions of the white men whom they believe to be a superior race of beings, their vices, their crimes, their dishonesty, their meanness, their stratagems to acquire the precious metals, and the cunning and duplicity they practise towards each other as well as to strangers; these nations would undoubtedly consider such efforts to obtain money and gratify ambition, as the true characteristics of barbarians.

If disputes or quarrels break out among them, they are all judges and mediators, and decide generally their opinion where the right and the wrong lie, without prejudice or partiality. If he who is palpably in the wrong continues obstinate and persists in his injustice, he is turned out of society, and constrained by reason or by reproaches to do what is right.

These savages are creatures of the present, and think nothing either of the past or the future. They live without much care or mental exertion. While they are in their villages, they do little else than eat, drink and sleep. They eat their meat either roasted or boiled, and are very fond of the broth. They consume neither salt nor spices because they have them not; there are no stated hours for their meals, but they take food when they are hungry. It is common for them to assemble and feast together; and their constitutions are such that they can endure hunger an extraordinary length of time, or gormandize in the most extravagant degree, without materially disabling themselves. It is reckoned unmannerly to refuse to eat when food is offered; commonly when a visitor enters a house, victuals are brought to him. In this case, he must swallow a few mouthfuls for civility's sake, whether he wants it or not. It would be thought rude if he did not. If a person is invited to an eating party, an event which sometimes happens repeatedly in the course of one day, it would be an affront not to go to them all. But he is not obliged to eat more than he pleases. If any part of what has been given him, is left unconsumed, the fashion is to carry the remnant home with him, to give

it away to whom he likes; as it is deemed impolite to leave the fragments behind. Having finished their social feast, they smoke their tobacco, together in full assembly.

He who understands smoking on such an occasion, fills a pipe with tobacco, and hands it to one of the principal men present to light it. Some young man without waiting to be bidden, immediately brings a coal of fire for the purpose. The person having the pipe then rises and requests the one from whom he received it, to smoke first. He takes three whiffs, and passes it to his neighbour, and then it travels round the circle. They always observe to make it circulate to the left, because the sun, they say, turns that way; and it is considered a violation of the ceremonial to invert the order and send the pipe round against the sun. He who lighted the pipe must clear it from the ashes of the tobacco, and then return it to the owner.

The strongest passion of these savages is their implacable hatred to their enemy; a sentiment which is accompanied by a restless spirit of revenge. They boast much of their bravery, and with this exception they are most supinely indolent.

A natural turn for gravity very much distinguishes them: and they are very cautious in all their words and actions. Their answers are short and commonly monosyllabic. If they are addressed on any subject whatever, they make brief remarks of this kind to the relater as he proceeds, "*That is good: very improper; admirable; there is reason in this; something worth the while*, &c. and without any further explanation or interruption they listen most attentively to the end of the discourse. It must however be remarked that when they are in council, they reason very well on their national interests. These they understand profoundly. And although they have no education, and are assisted only by the pure light of nature, they are capable of giving long discourses upon all sorts of subjects. It cannot be denied that some among them have excellent understandings, and decide with great judgment on their own affairs. In other respects, they are hard to convince, and insuperably obstinate. They are incapable of distinguishing a chimerical supposition from a settled principle, or a legitimate deduction from a false one.

These savages possess the most happy memories. Their power of recollection is very strong. I have heard very aged Indians relate exactly, all the presents they had made to strangers from their earliest years, without omitting the

most trifling article. They honour old age. The old men are considered as oracles; and they take great care of their persons. The employment of these veterans, who can no longer pursue the chase, nor engage in war, is to instil principles of order into the minds of the youth, and to prepare them by proper instructions, for entering into society. Sitting on the top of their huts, they talk the greater part of the day, to their pupils; they commend those who behave themselves according to the maxims and usages of the nation, and to the natural code derived from their ancestors, whom they quote as the most worthy examples and patterns. They openly blame the conduct of those who neglect or violate those rules. They encourage the women to labour, and the boys to hunt. They unremittingly recommend, that they should be kind-hearted to each other and live together without quarrelling. They repeat continually that the "Master of Life," or the *Great Spirit*, loves the man who has reasonable sentiments, is liberal, peaceable, generous towards his friends, courageous against his enemies, who respects age, who does not take to himself the best provisions, but suffers them to be eaten in common, and who frequently makes offerings to the Master of Life, of the flesh of fat cows.—They condemn those who seduce and debauch married women, declaring this to be the greatest source of disturbance among the red men. They advise the young men to get wives early, so that by becoming attached to those, they will not make attempts upon other men's wives.

But of all the moral precepts given by these aged orators, this last is the one which is least regarded. It would lead me a great length to relate all the subjects upon which these monitors discourse; but I have related enough to show that those persons who believe these natives to be stupid, uncultivated and incapable of thought or reflection, are grossly deceived. When I was young, I remember to have read accounts of the manners and customs of savages, written by the priests, and which although their authors passed for saints, were full of absurdities and contradictions. If I had not understood the Indian language, and observed for myself in the course of my travels, the manners of several different nations, I should have believed what they had written on this subject: but since I have resided with them, I have become wholly undeceived, having discovered that the Jesuits and Recollects who were the most famous among these authors, had particular inducements to publish and contradict each other as they did. For it is well known that those

illustrious personages, as well as many others, as well from Canada as elsewhere, agree as little with each other as the Jansenists and Moulinists.

Although the Indians have no more knowledge of geography than of the other sciences, they make delineations upon skins, as correctly as can be, of the countries with which they are acquainted. Nothing is wanting but the degrees of latitude and longitude. They mark the northern direction according to the polar star, and conformably to that, mark out the windings and turnings of the rivers, the lakes, marshes, mountains, woods, prairies and paths. They compute distances by a day's, or half day's journey. They divide the year into four seasons, each of which has its name, as among us. They have neither the division of time into hours nor weeks. Having never been possessed of clocks or hour-glasses, to divide the natural day into equal parts, they distribute it only into quarters and halves, that is to say, sun-rise, sun-set, morning and evening. They possess the knowledge, which can only be derived from long experience, of traversing the forests and prairies, an hundred leagues and more, without being lost or bewildered. Their sight is so acute, that they can follow a man or beast, by their tracks on the grass or leaves, for days together, without mistake. By some practical sagacity, they can tell almost exactly the time of day or night, although the sky should be overcast and neither sun nor stars be visible.

(To be continued.)

REVIEW.

TRANSACTIONS *of the Society for the promotion of* USEFUL ARTS, *in New-York*; ALBANY, BARBER, 1807, 8vo. pp. 236, *with plates.*

SEVERAL times in the course of our work, notice has been taken of the Society established at New-York, in 1791, for the promotion of Agriculture, Arts and Manufactures. That Society published a collection of papers, the succeeding year. In 1794, they printed a second and larger parcel of the communications made to them. A third volume came from the press in 1798, and a fourth in 1799. Of the two latter works, reviews may be seen in our first Hexade, vol. 2, p. 315; vol. 3, p. 386; and vol. 4, p. 57.

Afterwards, the copies having been distributed and grown scarce, a new edition of the whole was agreed upon. And accordingly all the four distinct publications were consolidated into one convenient book which made its appearance in 1800. Since that event, the time originally fixed for the duration of its charter, has expired. But the legislature, unwilling to let so useful an association undergo dissolution, passed during the session of 1804, a new and amended act of incorporation in their favour. By this, their title is simplified, and they are now called "the Society for the promotion of useful Arts." The volume before us is the first collection of papers that has been laid before the public, by this laudable body of gentlemen acting in their new capacity.

Having thus given a sketch of the history and proceedings of the parent Society, we proceed to inquire what merit or value ought to be ascribed to the offspring.

A distinguished contributor of information is R. R. Livingston, Esq. the President. The memoirs written by him occupy nearly one third of the volume. We shall enumerate them in succession.

1. *Minutes of his Journey from L'Orient to Paris, when he was sent to France as minister plenipotentiary, in* 1802. He went by the way of Nantz and Orleans, and made many judicious observations on the agricultural condition of the country. 2. *Observations on the employment of pyrites as a manure by the Farmers of Flanders.* This piece was inserted in our Hex. 1, vol. 6, p. 315. 3. *An essay on Sheep,*

wool and woolen manufactures, shewing the advantage of improving American wool, by the introduction of Spanish sheep. The writer gives a decided and conclusive preference to the Spanish breed, as better adapted to the wants and economy of this country than the British. The former are called Merinos, and Mr. L. is now the owner of several full-blooded rams and ewes. He purchased them in 1802, at a high price, from the national flock of fine wooled Spanish sheep in France. And these or their dams had been introduced into France 1786, by permission from the King of Spain, granted in consequence of an application from the French monarchy. The unmixed descendants of these Merinos are now at Clermont in Columbia county, (N. Y.) where the patriotic proprietor resides; and are increasing their numbers. 4. *Further remarks on sheep; and practical observations on the best way of yoking and working oxen.* He shows herein the probability of adding half a dollar to the value of each fleece at shearing-time, in less than five years, by the farmers who shall adopt his plan. He states very judiciously the pernicious consequences of keeping many dogs in a civilized and settled country. Their numbers ought certainly to be lessened. He advises farmers, in selecting their flocks, to breed them wholly either for long combing wool or for carding wool, but not to mix the fleeces. He appears to be convinced that the old Roman mode of yoking oxen by the horns, which is to this day practised over nine-tenths of Europe, deserves a preference to our way of making them draw by the withers, or to any other method of applying their strength. 5. *Experiments and calculations to show the profit farmers may derive from mixtures of the Merinos with common sheep.* The conclusion is clearly in favour of an improvement both in the weight and fineness of the fleece among the ewes, wethers, and rams of our country, by every mixture of merino blood. To these considerations, are annexed several extracts from Young's annals of Agriculture, on the greater profit of the merino breed of sheep, over the English varieties of that animal; and a string of economical queries concerning sheep, with their answers. 6. *Description of the mode of constructing walls of houses from Sand and Gravel around Lyons, by ramming; with Agricultural observations made in Brabant, Flanders, Champagne, Burgundy and other parts of France.* The mode of compacting the common materials of soil into a wall, as described by Mr. Johnson, (Med. Rep. Hex. 2, vol. 3, p. 97.) is here de-

lineated and illustrated by an engraving. This is followed by various remarks on grass grounds, tobacco, poppy-oil, hemp, maize, and vines as cultivated in the regions visited by Mr. L. 7. *A letter on the improvement in the Springs of riding Carriages.* Having been much incommoded by travelling in a private coach from Paris to Naples by the breaking of steel-springs fitted in the fashionable manner, Mr. L. found great advantage from placing *cushions of air*, between the folds of the thorough-braces of the coach, before and behind. These cushions were simply Italian foot balls made of Asses skins dressed in oil, and covered with stout calf-skins. By the employment of four such bags of atmospheric gas, the springs were saved from snapping all the remaining journey back from Bologne through Italy, Tyrol and Germany through Strasburgh to Paris. 8. *Additional evidence in favour of breeding Merino sheep; and a mode suggested of feeding swine during the year when there was no grazing for them, upon boiled clover.* It hence appears that the *unwashed* wool of the full-blooded merino sells at Clermont for one dollar and a quarter the pound; and that very good six dollar broad cloth has been manufactured from the half-blooded fleeces. It is stated too, that hogs may be kept in good order by a decoction of clover. This is prepared by mowing it, and packing it away in sea salt, after it has lain about six hours in swath, and about twenty four hours in cock. The proportion of salt, is a quart to a waggon load. It is thus kept green and juicy all the year; and when boiled in water, and given, leaves and liquor, to the swine, keeps them in very good case.

Having thus given a view of Mr. L.'s various memoirs, we deem it proper, before we pass to another article, to quote a passage from his dissertation on sheep, (p. 74).

"I have seen with pleasure that the agriculture of my native country has improved considerably, in the short space of four years, the time of my absence. Much however remains to be done before it acquires that perfection to which all nations should aspire, but which none that I have seen in Europe, Lombardy and south Holland excepted, have in any degree attained. England, though she boasts with reason some of the best farmers in the world, is but partially improved; many districts are ill cultivated and old habits are not yet rooted out. I shall, as time and leisure admit, take occasion to lay before you such practices of the old world as I think may be advantageously adopted by the new; at pre-

sent I wish to draw your attention to a subject which our probable rupture with some of the European powers, renders peculiarly interesting at this moment. I mean the improvement in our breed of sheep. It is upon this that we must rely for our independence upon Europe, in an article of the first necessity.

The sheep of this state, taken collectively, are superior to almost any native race that I have seen in France, Holland, Lombardy or Italy, and very much resemble the south down sheep of England. In general, the sheep of those countries are about the size of ours; those upon the sea coast on the channel and Lombardy are larger; those in Britany much smaller. The wool of most of these breeds is inferior to ours in fineness, if we except the sheep upon the borders of Spain, some travelling flocks in the kingdom of Naples, and those in the small district of Berry. Anderson says, that wool sent from New-Jersey sold at the rate of the finest wool in England.

I believe, in cold or temperate climates, the inferiority of quality in the wool, does not arise from climate, but from other accidental causes which I shall point out. In France I attribute it first to a neglect of those breeds that bear fine wool, and next to the manner in which the sheep are kept.—They are folded in close pens, during the summer, all night, and part of the day. In winter they are crowded in small and ill aired houses; they are fed upon the commons on the road sides, and on the stubbles, always confined close together by the shepherds' dogs, who are continually running round them, to prevent their straggling or touching the grain or meadows at the sides of them, for there are no fences.—In dry seasons they are extremely pinched for food, and in the winter no green fodder or clover is prepared for them, and very seldom even hay; they are left to glean in the fields when there is no snow, and when there is, to feed upon the coarsest hay, or the leaves and branches of trees, which is frequently the only provender laid up for them. It is held by the British agriculturalists, that bad keeping makes bad wool. If the sheep are alternately well fed, and starved, the wool will be of different strength and thickness, and of course unequal and of a bad staple.

That the climate effects no change in them, I infer from the great success that has attended the introduction of Spanish sheep, which, where they have been treated with a little attention, have so greatly improved in their size, form

and fleece, without any change in the quality of the wool, that full bred rams imported directly from Spain, may now be purchased in France at a much less price than rams from the national flock at Rambouillet; a race that were introduced about twenty years ago into France. Superfine cloth can only be made from Spanish wool, and that without mixture with other sorts, from which it differs so materially, that Anderson asserts, on the information of British manufacturers, that they cannot be wrought together. The different species of broad cloth are not made by mixture with British wool, but by Spanish wool of different qualities. The coarse cloths only, are made of British wool. France, as well as all the rest of Europe, being dependent upon Spain for the wool used in their fabricks of fine cloth, made various attempts to introduce Spanish sheep. In 1766, a number were imported and distributed among the people of different districts. But as the general opinion was, that Spanish sheep could only thrive in Spain, that the wool would degenerate if they did not travel from the plains to the mountains, and from the mountains to the plains, and above all as the peasantry thought, that what they received without price could be of little worth, no attention was paid to keeping the race distinct, and of course little advantage resulted from the measure, except to a few enlightened farmers: But their experiments sufficiently proved the practicability of the project, and determined the government to make the attempt again, and to put the direction of the project into the hands of a distinguished agriculturalist.

Application was made to the king of Spain for permission to draw from his dominions a number of Merinos, the name by which the fine woolled sheep are distinguished. He not only permitted this, but ordered that they should be chosen out of the finest flocks in the kingdom. In the year 1786, they arrived at Rambouillet, the national farm. Instead of giving away the increase as had before been done, they were annually sold, which of course put them into the hands of the richer and more intelligent farmers. At first they brought a very moderate price, but their superiority over the other sheep of the country, the great improvement in the wool that resulted from crossing the breed, were so manifest, and the evidence that experience afforded of their supporting the change of climate and treatment without any sensible change in the quality of their wool, rendered the demand for them so great, that they have considerably advanced in price.

In 1796, the average price was 80 franks, about 16 dollars the last sale (April, 1805,) the average price for a ewe was 250, that is about 50 dollars; rams brought from 60 to 120 dollars. This is the more remarkable, as by the last treaty between France and Spain, the former had a right to draw 5000 Merinos from the flocks of the latter, 500 to be chosen annually for ten years. Skilful shepherds were sent to select them, and France now possesses above thirty thousand of these sheep by importation and by natural increase, and yet the price of the stock at Rambouillet has been regularly on the rise. The late minister of the interior, M. Chaptal, has a very fine flock consisting of 1200 sheep. As the sales at Rambouillet were over before I returned from Italy, I requested him to spare me five from his flock, to which he consented, provided I only took lambs and not more than two rams, for which I was to pay 1500 franks, about 300 dollars; this too was a very special favour. The shepherd I sent to choose them found the flock infected with the scab. I did not therefore think it prudent to take them, but left the money with a gentleman who has promised to bring them out next spring, either from that flock, or those at Rambouillet. I should mention another circumstance which proves that the wool does not grow worse in France, when the stock from which they sprung was good. In April every year, there is a sale of lambs of the preceding year, and of wool; the price of the latter was kept down by the artifices of the wool dealers, who pretended that it was inferior to Spanish wool. Some of the manufacturers, however, having for the two or three last years produced cloth at the exhibition, made of this wool equal to that from the finest Spanish wool, the price has advanced to a par with the wool brought from Spain.

I should observe that the fine French cloths are finer and softer than those made in England, probably because very little of the finest Spanish wool goes to England, their import consisting of the second and third sorts with some still coarser. The finest of the wool, to the amount of about three millions of pounds, is manufactured at the royal factories in Spain, and the remainder goes to France and Italy. The quantity of wool drawn from Spain by France, was before the revolution about 4,000,000lb. but the manufacturers having been ruined during the revolution, it was greatly diminished; what it is now I cannot declare. In the year 1786, England imported only three millions, but in the year

1796, the following is the state of the legal export from Spain; some is always smuggled into France and elsewhere.

France - - - - - - - - - -	600,000
England - - - - - - - - -	6,000,000
Holland - - - - - - - - -	3,200,000
Italy - - - - - - - - - -	1,000,000
	10,800,000

Spain employs about 3 millions of pounds in her own manufactures. It may be proper here to observe, that all the sheep of Spain are by no means Merinos, but more of the stationary flocks are either what they call Chorinos, which are a large hardy coarse woolled breed, or a mixture between them and the Merinos; part of this latter wool is also exported.

As my object in this essay is to endeavor to impress upon my country the importance of propagating this breed of sheep, it may be proper to shew the value of this wool compared to that of other races, and particularly of that of England, and to remove some false ideas that have gone abroad relative to them.

The prices at Madrid for washed wool, in the year 1796 were as follows:

				c		*Cts.*
Leonise	from	5	to 5	4	about	100
Segovienne		5	4	60		88
Sorriens		4	4	25		86
Arragon		3				60

Anderson gives the value of wool in the London market about the same period, which reduced to our money stands thus: for the best

German	22 Cents.
Polish	25
British	17
White Persian	84
Red Carramuman	100
Spanish	93

The Merinos are rather smaller than the largest sheep we raise on the north of the highlands. Those bred at Rambouillet are better made than those imported directly from Spain. The belly, cheeks, forehead and hind legs, are covered with wool that is short, curled and thick, and though extremely white when washed, yet brown at the extremities when on the sheep, particularly if folded or kept on any but the cleanest pasture; this is owing to the extreme thickness

of the wool, which encreases the perspiration of the animal, or rather perhaps to the greater quantity of grease that the wool contains, for in this circumstance it greatly differs from common wool, and it is never found harsh or dry. The wool on the thigh, which on our sheep is harsh and intermixed with hairs, in the Spanish sheep is soft and fine.—From the thickness and evenness of the fleece the sheep is guarded against the wet and cold more effectually than our sheep, whose fleeces are looser, and whose bellies after the second or third year, are only slightly covered with hairs instead of wool. Mr. Macro observes that the most thrifty sheep throughout the winter, are those that have the thickest and most even coats. The fleece is entirely free from hair which renders other wool harsh, and which never takes the dye perfectly. Having procured samples of all the wool that could be obtained in France, together with the improvement made in each by crossing the different breeds of sheep with Spanish rams, I shall lay them before the society, which will enable them to form their own judgment as to the quality. The inferiority in the size of the Merino, to some other breeds, which some make as an objection, is in my opinion an important advantage, not only in sheep, but in every other stock not designed for the draft; because they will fatten in pastures in which larger cattle would suffer from the fatigue they must undergo in order to procure the food that is necessary for their support. This reasoning applies more strongly to sheep than to any other stock. They are generally kept upon high and dry pastures, that are frequently parched in summer, when fatigue is most irksome to them. To which we may add, that the fleece is not proportioned, as the food is, to the *bulk* of the animal, but to his *surface*, and a small sheep having more surface in proportion to his bulk, must also have wool in the same proportion. That is, a sheep whose live weight shall be 60lb. and who of course will require but one quarter of the food of a sheep that weighs 240lb. will, notwithstanding, have half as much wool (if the fleeces are equally thick) as his gigantic brother. The Merino has been found in France to be quite as hardy as the common sheep. At Rambouillet they have no winter feed but hay, and yet thrive very well; but what is more extraordinary, is, that in Sweden, where the native sheep are extremely coarse woolled, the Merino has been naturalized without having in any sort changed the nature or quality of the wool, in the term of about 30 years since they were introduced.

They have also been so well cultivated there, that though the consumption of fine wool has increased in Sweden, yet the importation of Spanish wool has greatly diminished."

We recommend the whole memoir to the careful perusal of every patriotic farmer, and to all friends to their country's independence.

Another member who contributes liberally to the present volume, is *Simeon De Witt*, Esq. second Vice-President of the Society. The communications of this ingenious gentleman consist, 1st. *of a description of a Churn upon a new construction, called a drill churn, to which is added an explanation of the whip-churn;* 2. *A mode of preserving the sweetness of Butter for family use.* This is done by immerging the rolls in a pickle of sea salt and water, to which some saltpetre is added, and thereby preventing rancidity, by cutting off all connection with the atmosphere. All these are accompanied with illustrations by plates; 3. *A description of two Protractors, to facilitate surveys and calculations, one for office-use, and the other for field-use.* These two instruments seem to be happily adapted to determine angles, and to assist Geometricians in marking courses, and in finishing cards and plats of survey. They are both rendered more intelligible by figures and references.

A third labourer in this field of usefulness and honour, is *Ezra l'Hommedieu*, Esq. first vice-president of the society. His papers are the following: 1. *On the cleaning of casks to receive cider.* This is done by taking for a barrel, one pint at least of unslaked lime; put it into the barrel, and pour into it two or three gallons of hot water; bung the barrel, and shake it, remembering to give the vapours vent now and then. After agitation, let all cool, and then rinse out with cold water. The vessel will then, it is alledged, be perfectly sweet. 2. *A method of preventing the smut in wheat.* To alkaline ley and lime-water, heretofore found serviceable for soaking the seed-wheat with the view of preventing this disease, Mr. H. adds common brine; and proposes as the most cheap and handy for farmers the old pickle in their beef and pork barrels, without either boiling or clarifying. Ashes, lime, or gypsum, in powder, are recommended to be sprinkled over the grains, after soaking, for the purpose of guarding more certainly against smut. 3. *An account of a disease very destructive to the Flax, on Long-Island.* This disorder in that useful plant, was observed first about 1803, in Suffolk county, at Bridgehampton. Since

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that time, it has been observed in various other places. It is described as not injuring the flax in any sensible degree while it is yet green and growing; but as soon as the stalk becomes dry, a small black spot is discernible about the size of a pin's head, a little above its middle, and in some instances, a small black streak of about half an inch or more proceeding from the black speck. When the flax comes to the crackle or brake, all the stalks which have such specks or stripes break off, and become useless. Mr. l'H. is of opinion that this malady is not owing to mildew, but to some pernicious insect. As, however, he has fully ascertained this fact, and the loss of many crops of flax is a very serious evil, he advises Farmers to be more vigilant than heretofore, on the subject. 4. *Method of destroying the weevil (Curculio) in Wheat.* This is accomplished by lime-washing the bin, and sprinkling a handful of unslaked lime over every four or five bushels, and after all the wheat is in, dusting the top with a few handfuls more. 5. *A simple and effectual method of preventing the destruction of Sheep by Wolves.* The mode prescribed of guarding this feeble and harmless animal from its ferocious destroyer, is to daub the throat with an ointment made of finely powdered gunpowder and brimstone softened by currier's or fish-oil. It is affirmed the wolf will not bite the parts that are thus besmeared. And having no propensity to begin his attack upon any other part, the sheep escape his voracity. By renewing the unction four or five times in a season, the flock is preserved from the tooth of its blood-thirsty enemy. This information is grounded on the experience of Mr. Walter Briggs, of Schoharie, who saw a wolf running among his sheep and jumping from one to another, without offering to bite any, because they were protected by this unsavoury and disgusting composition.

Various other tracts in this interesting volume claim our attention, particularly, a view of the incorporated turnpike Bridges and Road Companies, in the state of New-York, by Dr. Benjamin De Witt, and a plan for introducing uniformity in the weights and measures of the U. S. by the late Gen. Schuyler. But these and other valuable matters must be postponed to a future number.

(To be continued.)

A concise treatise on LEECHES; *being the only essay on the subject ever published by any writer, wherein the nature, properties and usefulness of that most singular and valuable reptile are clearly set forth, by* GEORGE HORNE, *Surgeon, New-York, 8vo.* 1805. *Waite, pp.* 29.

BLOOD is the substance which this most greedy animal delights to feed upon. The appetite for it is so strong that when he fastens upon the skin, he never voluntarily quits his hold before he is filled and glutted. When many of them attack at the same time a warm-blooded animal, they may destroy him by loss of blood and by wounds. Man, who possesses the sagacity to turn almost every thing to some amusing or valuable account, has discovered the art of converting the voracity of Leeches to the removal of certain diseases which afflict him.

The letting of blood is one of the most safe and efficacious means of acting upon the diseased body. It may be done by *general* phlebotomy, as in the common operation of opening a principal vein at the elbow, or it may be *partial*, as when scarifications and punctures of the smaller vessels, both veins and arteries, are made for local purposes. Experience has proved that many local diseases are very little, if at all, affected by general blood-letting; while at the same time the drawing of a due quantity of blood immediately from the diseased spot, produces a powerful effect. And by availing themselves of the instinctive relish of Leeches for blood, practitioners have learned the art of enlisting them under the banners of Æsculapius, in the capacity of bleeders. From the small quantity of blood they extract, and from the power the operator has acquired of making them bite the very spot which he chooses, Leeches have been found to be valuable auxiliaries to the Surgeon, in relieving his patients from their sufferings. And long and ample experience has proved their usefulness where local blood-letting was necessary.

Naturalists have described fourteen species of the Hirudo or Leech. The animal belongs to the 6th class of animals, called *Vermes*, and to the first order which includes those called *Intestina*. One of the species is denominated *Medicinalis*, from the use made of it in the practice of physic. Its character is given in the following words: *Hirudo elongata nigricans; supra lineis versicoloribus, subtus maculis flavis;* that is, *the long blackish Leech with changeable lines above*

and yellow spots below. This worm lives in ponds and marshes; on the upper side are many annular wrinkles which it can dilate or contract at pleasure; on each side of the back are four lines, the first of which is red, the next red spotted with black, the third black, the fourth yellow; the belly is yellow, variegated with black, and there seem to be no eyes. It is an excellent bleeder, and is employed with advantage to hæmorrhoidal tumours, inguinal buboes, and other local swellings, inflammations of the eyes, and various diseases of children.

The horse-leech with which it is most likely to be confounded, is the *Hirudo sanguisuga.* The character is, *Hirudo elongata nigra, subtus cinereo-virens, maculis nigris;* that is, *the long black leech, of an ash-coloured green beneath: with black spots.* It lives in ditches, ponds and marshes, and is sometimes more than four inches long, sometimes the middle of the belly is destitute of spots; it has sometimes been substituted for the Medicinal leech. It is so greedy of blood, that Linnæus writes, nine have been known to bleed an horse to death.

There are plenty of leeches in the ponds and waters of New-York. But so little attention has been paid to their history, that we do not positively know whether the true *medicinal* leech is found among them. It has long been a subject of regret that these animals have never been kept for extemporaneous use in the shops. Physicians have hitherto wished in vain for the assistance of these blood-suckers, to relieve their patients from a number of the ills they endure. We hope the time is not distant when naturalists will decide whether the medicinal leech inhabits our pools. If it is a native of our country, we hope it will soon be brought into practical use. If it is not, we seriously recommend its speedy introduction from foreign parts, to breed and multiply in our waters.

Having premised these considerations, we proceed to notice Mr. H.'s tract on the history and use of this remarkable animal. We consider its publication as very seasonable; and calculated to excite the curiosity and zeal of medical gentlemen on this part of the Materia Medica. The writer has considered the subject in a plain, popular, and practical way. He expresses his ideas like one who knows how to catch, preserve, handle, and apply leeches. And it would give us pleasure to find that his exertions to recommend the

introduction and application of them, should be crowned with success.

His brief memoir is divided into five sections. In the first, he treats of the different sorts of these animals; in the second, of their structure; in the third of the manner of keeping them for use; in the fourth, of the cases wherein they are calculated to be serviceable; and in the fifth, of the manner of making them inflict their bites in the very spots whence blood is intended to be extracted.

As a specimen of Mr. Horne's composition, we should lay before our readers his 3d and 5th sections in his own words, but our limits do not permit.

A description of the Genessee country, in the State of New-York; in which the situation, dimensions, civil divisions, soil, minerals, produce, lakes and rivers, curiosities, climate, navigation, trade and manufactures, population, and other interesting matters relative to that country, are impartially described. By ROBERT MUNRO, *New-York*, 1804, 8*vo. pp.* 16, *with a small map.*

WHEN we reviewed Captain Williamson's publication on the Genessee country, in M. R. hex. 1. vol. 2, p. 397, an ample detail was given of many particulars relative to this celebrated region. Since that time, Mr. M'Kinnen's description of the same tract, or of the country situated south of Lake Ontario, has been laid before the public in various periodical publications. Now Mr. Munro has undertaken to give an account of it. His piece, though brief, contains a valuable share of information. We are highly pleased to lay our hands upon good topographical sketches of this kind; and we accordingly republish a few pages of the work (from page 6 to 10), as well to give our readers an idea of the manner in which it is executed, as to diffuse more extensively the information it contains. We congratulate those who have pitched their tents in this land of promise, on the quantity of salt, brimstone and gypsum, with which it abounds.

Several mineral springs have been discovered: one of sulphur, situated 12 miles north-west from Geneva, is of a sufficient size and fall for an overshot mill, and its scent is con-

veyed by the wind nearly the distance of two miles. This spring issues out of the ground in different branches, and adjoining it are two large bogs of sulphur, into which a stick may be thrust upwards of six feet deep. It is supposed, that at this spring the manufacture of brimstone would be considerably important. Near this spring a house for entertainment is opened, which is much frequented, either from motives of pleasure, or the medicinal qualities of the spring. A spring is reported to be discovered near Canandarqua lake, the water flowing from it forming a crust of alum on the adjoining rocks. A salt spring is said to be discovered west from Genessee river; but the inhabitants are at present plentifully supplied with that valuable article from the salt works in the military lands, at the distance of 10 to 60 miles, and it is sold and also exchanged for grain, near Geneva, at a dollar a bushel. Near the head of Genessee river there is a remarkable spring, the water issuing from it being covered with a sort of oil called by the Indians Seneca oil, which is excellent for wounds and other medicinal uses. A considerable quantity of Plaster of Paris was lately discovered near Geneva, which is reported to be of a good quality.

This country is considered as indifferently watered in regard to springs and running water; but it is expected that the further clearing of land will cause a greater plenty of that article, which at present frequently runs under ground by the hollowness which is occasioned by the roots of trees; and a considerable quantity is now probably consumed in the nourishment of timber. Water is, however, readily found by digging wells, commonly 15 to 20 feet in depth, and is not worse in quality than in many of the most populous parts of the United States. The practice of the inhabitants of building adjoining the public roads, often occasions too great a distance from springs; and they might frequently be conveniently supplied with water, were they to build on other parts of their farms. There is, however, a considerable number of streams suitable for mills; insomuch that the greater part of the inhabitants are not farther distant than a few miles from mills, which are plentifully supplied with water in all seasons.

As to curiosities, the falls of Niagara and of Genessee river, are very remarkable; the falls of Niagara being the greatest curiosity of the sort in the world, falling 157 feet perpendicularly, where the river is three quarters of a mile wide, and are sometimes heard at the distance of 40 or 50

miles. There are many remains of ancient fortifications, a chain of which appears to extend from the lower end of lake Ontario to the west of the Ohio river. These forts afford much speculation concerning their origin, but the most probable conclusion is that they were erected by the French upon their first settlement in America, about 200 years ago.

The following are the principal rivers and lakes:

Genessee river, rising in Pennsylvania, runs a north-easterly course of above 100 miles, and empties into lake Ontario. It is situated 40 miles west from Seneca lake, and is boatable nearly 50 miles, but its navigation is interrupted by some falls. On this river are extensive and very rich bottoms, which are in some parts nearly two miles wide, and are partly overflowed in the spring season; in consequence of which the inhabitants near them are subject to agues and other bilious complaints. Its flats are in some parts cleared of timber for several thousand acres, which are covered with very high and thick grass.

The Tioga river receives the waters of the Canawisque, Canisteo and Conhocton rivers, and flows about 8 miles through the south-east corner of this country to the Susquehanna river at Tioga point. From this river, arks loaded with 1200 bushels of grain, boats and rafts of lumber, proceed to markets on the Susquehanna river, and even to the city of Baltimore.* In the spring of 1804, it is supposed that 50 or 60 arks and boats, laden with produce from this country, besides many rafts, were floated down this river to the Susquehanna.

Conhocton river rises near the east of Genessee river, and running a south-easterly course, empties into Tioga river. From this river, arks loaded with 1200 bushels of wheat, boats and rafts of lumber, are floated by Tioga and Susquehanna rivers to markets in the lower parts of Pennsylvania and Maryland, every spring, sometimes in summer, and commonly in the fall; and loaded boats navigate from Susquehanna into this river until midsummer.

Canisteo river rises south from Conhocton river, and run-

* It is expected that a great part of the produce of this country will soon be transported to the Philadelphia market, by a turnpike road, which is nearly completed, between Nifcopeck, on the Susquehanna, and the river Lehigh, which discharges itself into the Delaware river; the diftance of the road being 23 miles. By this route, it is faid, the moft difficult falls on the Sufquehanna may be avoided, and produce will command the higheft prices.

Produce which is transported down Sufquehanna river, is infured by Mr. Goldsborough at Newtown.

ning nearly in the same direction, empties into Tioga river. It is navigable for arks, boats and rafts, for about 40 miles in spring and fall.

The Canawisque runs south from Canisteo, empties into Tioga river, and is navigable in spring and fall.

Mud Creek rises east from Genessee river, and runs a north-easterly course to Seneca river. It is navigated by boats from Lyons, 14 miles north from Seneca lake, and about 15 miles from its junction with Seneca river; from whence boats proceed to the neighbourhood of Albany, or into lake Ontario. On this creek are very fertile and extensive flats, which are overflowed in freshes.

Alleghany river rises in Pennsylvania, near the southern boundary, and runs in this country a westerly course 46 miles, thence southerly to Pittsburg, on the Ohio river. It is navigable by arks and boats in the spring season, from this country to the Ohio, or to the Gulph of Mexico.

The Conowongo river rises east from Lake Erie, running southerly to its junction with Alleghany river. This river, at the distance of only 9 miles from Lake Erie, is boatable into the Alleghany river.

Tonawanda creek rises west from Genessee river, runs a westerly course, and falls into the streights of Niagara; it is navigable by boats several miles.

Buffalo creek rises south from Tonawanda creek, runs a westerly course, emptying itself into the streights of Niagara. The lands on this creek are remarkably good in quality.

Lake Ontario, by which this country is bounded on the north, is about 180 miles in length, and about 60 miles in breadth. Its shores are watered by many creeks and inlets, which form excellent harbours for vessels; and the adjoining lands are generally fertile. It is navigated by several sloops and schooners, and a British armed brig, pierced for 16 six pounders. From this lake, large boats proceed by the river St. Lawrence, nearly to Montreal, a large populous and commercial city in Canada, where considerable quantities of produce and lumber from this State and Vermont, are sold, and shipping take in cargoes for Europe and the West Indies. From this lake also, by Oswego and Onondago rivers, Oneida lake, Wood Creek, and Mohawk river, navigation is extended to the Atlantic Ocean, only with the interruption of 16 miles by land from Schenectady to Albany. Navigation is continued from this lake, with the interven-

tion of two carrying places not exceeding the distance of 23 miles, by lake Erie, to the waters of the Ohio and Mississippi rivers.

Lake Erie, by which this country is partly bounded on the northwest, is nearly 300 miles in length, and nearly 40 miles in breadth. It is navigated by some sloops, and from hence there is a carrying place of 14 miles to Le Bœuf, in Pennsylvania, near the head waters of French creek, which is navigable by boats to Alleghany river, and from thence to the Ohio ; and by this route quantities of salt, which is transported from the Military Lands, are conveyed to Pittsburgh. This communication was used by the French before the taking of Fort Pitt from them by the English in 1758, and it is probable that by it, goods could be transported from New-York and Albany to the Ohio, at less expence than by any other. There are also communications from the waters of this lake to the Ohio, by the Muskingum and Scioto rivers. Navigation is interrupted from lake Erie to lake Ontario by a carrying place of 9 miles at the falls of Niagara.

Seneca lake is situated on the eastern line of this country, and is 35 miles in length, and from 2 to 4 miles wide. It stretches in a direction nearly from south to north, forming a handsome sheet of wholesome water, of a great depth, and never freezes over in winter ; and in summer, a bottle being let down under the surface, is filled with cool and pure water. It is navigated by a sloop and pettiauger, besides boats, and by its outlet boats proceed by Seneca and Onondaga rivers to Schenectady. From this lake also, boats proceed by Seneca and Oswego rivers into lake Ontario, and from thence to Montreal, &c. From the head of this lake, there is a carrying place of 22 miles by land to Newtown, on Tioga river, to which place considerable quantities of produce are transported, and from whence they are floated to markets on the Susquehanna river.

Crooked lake is situated 8 miles west from Seneca lake, is 20 miles long, and 2 or 3 miles wide. From this lake there is a carrying place of 7 miles to the Conhocton river, where it is boatable in spring and in fall to the Susquehanna. A considerable part of the lands adjoining it are reported to be of the best quality.

Canandaiqua lake is situated 20 miles west from Seneca lake, is nearly 20 miles in length, and 2 miles in breadth.

Chataughqua lake is situated near lake Erie, and is near-

ly 15 miles in length. The lands near this lake are very rich.

Mud lake, Honeyoy, Hemlock, and Canesus lakes are situated from 10 to 35 miles west from Seneca lake, are from 6 to 10 miles long, and from them are easy carrying places by land to the boatable waters of Susquehanna.

The climate appears to be subject to changes, which is probably caused by the neighbourhood of the immense bodies of water contained in the lakes by which this country is partly bounded. These lakes also are probably the cause of the mildness of the climate in summer and winter; for the air passing over extensive bodies of water which are of nearly the same degree of coldness in summer as in winter, and freeze not in winter, is more uniform in its temperature than it would be if it passed over land. The northerly and westerly winds which occasion an extraordinary coldness in winter, spring, and fall, on the east side of the Alleghany mountains, by blowing from the high and cold tract of country composed of those mountains, are tempered in this country by passing over the extensive bodies of water which are situated on the northern and western bounds; and the south wind does not produce those frequent changes in winter which are injurious to the raising of grain in the easterly parts of the states. Whilst the neighbourhood of these lakes also renders the air in summer cool and temperate; and the nights, very few excepted, are so cool as to admit of sleeping under blankets. The heat of summer in this country is accordingly more temperate than in the eastern parts of the States, which are situated even in a more northerly latitude; and the frosts in winter are remarked as less violent than in the middle states.

In most parts the climate is healthy, particularly as a newly settled country, of which an inconsiderable part is yet improved; though in the neighbourhood of marshes and stagnant waters, the inhabitants are subject to agues and other bilious complaints. Once in three or four years, as is the case in most countries, it has been sickly in many parts. The fall of 1801 was probably as sickly a season as any one since the earliest settlement; which is imputed to an uncommon wetness of the weather, occasioning much stagnant water. The prevailing sickness, which was the bilious fever, proved however not very mortal to the sick; and the number of deaths was most probably not more than one for every two hundred inhabitants.

Trees usually put forth leaves, the earliest sorts in the first week of May, and oak and other later sorts near the 25th of that month. Corn is planted from the 15th to the 25th and by some near the 1st of May. Rye begins to ripen, and hay is begun to be cut near the 4th of July, and near the 20th of July wheat harvest is begun. Water commonly begins to be frozen near the first week of October, and snow usually falls near the 20th of November; but cattle are sometimes kept in pasture until January, and on the flats of Genessee, nearly the whole winter. Snow commonly lies about nine inches deep. In the beginning of the year 1800, snow fell in most places about three feet deep, but there is no other instance known of so great a fall of it. The continuation of snow, besides its usefulness to grain, renders sleighs common and convenient for the transportation of produce to market, a pair of horses travelling, with thirty bushels, at the rate of 35 or 40 miles in a day. The winters usually break up about the middle of March."

The military tract in Onandago county, is thus described by Mr. M. p. 14 to 16.

"The military tract was granted by the legislature of New-York as a gratuity to the officers and soldiers of the line of this state, which served in the American revolution. This tract contains a million and a half of acres, and is divided into 25 townships, containing 60,000 acres each, which are again subdivided into lots of 640 acres each. It is bounded west by the counties of Ontario and Steuben, in the Genessee country; on the north by lake Ontario, about 10 miles to fort Oswego; thence on the east by Oswego river; thence on the north by Onondago river and part of the Oneida lake; on the east by Oneida and Chenango counties, and on the south by Tioga county; and is in length 60 miles, and 55 miles in breadth.

The face of the country is generally even, but not level. On each side of Cayuga lake the land rises very gradually for some miles, and in the other parts it generally consists of gentle swellings; but the eastern parts are broken into hills of gradual ascent. The quality of the land is, with little exception, of the best sort, being in general loamy, and is nearly the same as described in Genessee; as are also the timber, productions, and animals.

The following are the rivers and lakes:—

The Seneca river issues out of Seneca lake. It is joined by the outlet of Cayuga, and by Mud Creek from the west;

and by Onondago river from the east. From the junction of Onondago river to Oswego, where it discharges itself into lake Ontario, it is called Oswego river. The course of navigation from this river to Schenectady, by Onondago river, Oneida lake, Wood creek, and the Mohawk river, is already mentioned.

Cayuga lake, situated 10 miles east from the western bounds, is 40 miles in length, and from 2 to 4 miles in breadth, extending in a north-westerly course, and makes a handsome appearance. It is well stored with fish. From this lake, boats proceed by Seneca river, &c. to the neighbourhood of Albany, or into lake Ontario; and from its head, produce is transported 30 miles to Owego, on the north branch of Susquehanna, from whence arks, boats, and rafts are floated to markets on Susquehanna river.

Owasco lake is about 12 miles long, and is well stored with fish. The lands adjoining it are remarkably excellent.

Skeneatelis lake is nearly 16 miles in length.

Otisco lake is about 8 miles in length.

Onondago lake is situated near the north-eastern parts. Salt is manufactured at springs adjoining this lake, in a reservation of land belonging to the state, in very considerable quantities. The salt weighs 56 pounds a bushel, and it is sold at the works, at two dollars a barrel, containing 5 bushels, and sometimes cheaper.—From these works, the western parts of this state are cheaply supplied with salt, and considerable quantities of it are transported to Canada in the neighbourhood of lake Ontario and lake Erie, and to the Ohio. The salt springs appear to be inexhaustible, and sufficient for the supply of works of any extent. Iron ore has lately been discovered in the neighbourhood of this lake, where a furnace has been erected, and is worked to advantage.—Slate appears to abound in some places between Seneca and Cayuga lakes, and adjoining the head of Seneca lake.

Seneca lake, which is situated on the western bounds, is before described.

The eastern and southern parts are partly watered by the Chenango river, which is boatable in spring to Susquehanna river, and from thence boats and arks proceed to Baltimore; and by Salmon creek, Fall creek, besides many lesser streams.

This country is divided into three counties, viz. Seneca, Cayuga, and Onondaga. Population has been uncommonly rapid, notwithstanding the discouragements proceeding from

disputed titles to these military lots; several deeds having been frequently granted for the same lots, and nearly one third of these titles are yet undetermined, though they are expected to be shortly ascertained by commissioners who are appointed for that purpose by the state legislature. The number of inhabitants amounts nearly to 30,000. Between Seneca and Cayuga lakes, the settlers are mostly from Pennsylvania, Jersey, and the eastern parts of this state, and in the other parts, they are mostly emigrants from the New-England states.

The most considerable village is Aurora, which is pleasantly situated near the Cayuga lake, and contains about 25 dwelling houses, several stores, and an academy. Cayuga village is situated near the outlet of Cayuga lake, and consists of about twenty dwelling houses, and several stores. The Cayuga bridge is built over the lake at this village; it is in length, nearly a mile, and cost 25,000 dollars, which is defrayed by a toll. Levana village contains 20 houses. At this village, Mr. Richardson some years ago had 425 acres under a crop of wheat, which produced 12,000 bushels.—The turnpike road to Albany is before described, and on some parts of it are buildings and improvements closely adjoining to each other, which have the appearance of villages. This road in the year 1792, was only an Indian path a little improved, and settled only with a few straggling huts 10 or 20 miles from each other, for the distance of nearly 100 miles; and was then the only road leading to this country and Genessee. Many parts of the country are well improved, and make a pleasant and flourishing appearance.

From this country, a considerable quantity of produce is transported to Owego on Susquehanna river and to Newtown, at which places a considerable part was, in winter beginning 1804, sold for money, and from those places was floated in arks and boats to markets on the lower parts of Susquehanna. Wheat is also sold for money at mills, at which it is floured; and wheat is transported to Albany. A considerable quantity of produce is carried by sleighs in winter to markets on the Mohawk river. Potash is often manufactured and transported to Albany. Whisky is distilled in considerable quantities. Cattle, particularly cows, and sheep, always command a liberal price in money, and grain and other produce are sold for money to settlers emigrating into this country. The prices of produce are nearly the same as in the Genessee country.

LEWIS EVANS'S *general* MAP *of the middle British colonies, in America, and his Analysis of that Map; to which is added an account of* THOMAS POWNAL'S *Topographical description.*

ONE of the greatest improvers of American Geography, was Lewis Evans, a Pennsylvanian Surveyor. This man had made many journeys into the neighbouring colonies, and had been frequently employed in surveying lands, purchased of the natives. He had also traversed considerable tracts of the country which they had not sold to the whites. And he had collected a great store of materials from other sources. From these, he compiled a Map of the middle colonies, and of the adjacent country of the Indians, lying northward and westward. It appears that the first edition of his map was published at Philadelphia, in 1749. A second edition appeared there in 1755, from the shop of B. Franklin and D. Hall. It is accompanied by an explanatory pamphlet of thirty two pages in quarto.

Some expressions made by Mr. E. countenancing the title of France to Fort Frontenac, brought him into a controversy with a writer in Gaine's New-York Mercury. The piece against the concessions made by Evans in favour of the French, was published on the 5th Jan. 1756. In the course of the same year, he wrote a full and elaborate reply to this and other charges against him, and caused them to be printed by Dodsley in London. The pamphlet is a quarto of thirty five pages.

They are both offered to the public under the title of *Geographical, Historical, Political, Philosophical* and *Mechanical Essays.* No. I, and No. II.

The first edition of this celebrated map, was limited chiefly to *Pennsylvania, New-York, New-Jersey, and Delaware.* The second edition was much enlarged by the author. For then it became *A general map of the middle British colonies in America,* to wit, *Virginia, Maryland, Delaware, Pennsylvania, New-Jersey, New-York, Connecticut and Rhode-Island, the country of the confederate Indian nations,* the region of their residence, on the south of the great lakes, the deer-hunting grounds on the west, and their beaver-hunting tracts on the north of them; to which were added Lakes Erie, Ontario, and Champlain, and part of Canada. The sheet was handsomely engraved and coloured in London; and sold by Dodsley. It was inscribed to the honourable Thomas Pownal.

Afterwards, in 1776, on the breaking out of the war, between Great Britain and her colonies, which terminated in the independence of the latter, Mr. Pownal himself gave a new edition of Evans's map, with large additions; this was published by Almon in London. It appeared under the title of *A map of the middle British Colonies, in North America: First published by Mr. Lewis Evans, of Philadelphia, in 1755; and since corrected and improved, as also extended,* with the addition of Massachusetts and New-Hampshire, making it comprehend all New-England and the bordering parts of Canada; from actual Surveys now lying at the board of Trade, by T. Pownal, M. P. The editor published as a companion to the map, *A topographical description of such parts of North America, as are contained in the (annexed) map, &c.* This descriptive account of the map and country is a work of sixty two pages in Folio. And when it is considered that Mr. Pownal who was then a member of the British Parliament, had been successively Lieutenant Governor of New-Jersey, and Governor of Massachusetts bay, and South Carolina, it may be easily conceived that his opportunities of acquiring this sort of knowledge were considerable.

In reviewing the useful labours of our predecessors in Science, it is an agreeable employment to mention their names with respect and honour. Governor Burnet of New-York, Mr. Thomas Godfrey, of Philadelphia, Mr. Thomas Robie of Boston, and Mr. William Franklin, are mentioned by Mr. Evans as having aided him in his astronomical researches. His geographical labours were aided by the observations and collections of William Alexander, Esq. of New-York, of the Rev. Dr. Klap, of Connecticut, the Surveys of Messrs. Helm, Wellogg and Chandler, on Connecticut river, of William West, Richard Peters and Thomas Walker; on various objects of information by Fry and Jefferson's map of Virginia; by Capt. Hoxton's Chart of Chesapeake Bay; on the part of a circle of 12 miles radius from New-Castle in Delaware, by Mr. Thomas Noxon; by Mr. Edward Scull, in his surveys on the Lehigh and Delaware; and by Joseph Dobson, Alexander Magnity, Alexander Lowry, and John Davison, by their surveys on the Ohio and its waters. To the assistance afforded by these gentlemen to Mr. Evans, Governor Pownal adds the aid afforded by other persons to himself. He makes acknowledgments to Mr. John Ruke Bleecker, Deputy Surveyor of the province of New-York, for valuable topographical information concern-

ing the country around Albany, and in the vicinity of the Mohawk river; to Sir William Johnson for surveys of the parts near Lake George, Wood Creek, and the drowned lands thereabout; to Capt. Holland and his deputy Mr. Grant, for the facts relative to the communication by land from Connecticut river to the river St. Francis; to Dr. Douglas for the valuable matter comprised in the map, accompanying his *Summary;* to Governor Bernard, the Earl of Dartmouth and Mr. Lewis, a clerk at the Board of Trade, for their politeness, generosity and aid.

Governor Pownal complains heavily of a pirated edition of Evans's map, published in London, by Thomas Jefferys, and afterwards extensively sold by his successor Mr. Sayer, very much to the injury of the author, and to the deception of all those who peruse that spurious performance. He says it may as well be called a map of the moon, as of the middle colonies.

As the geological remarks of Lewis Evans have been often quoted, and his analysis of his map has become very scarce, we insert the general description he has given of the face and aspect of the country; (from Analysis, p. 6.)

"*The face of the Country.*

"For the better understanding the face of the country, and the navigation of the rivers, it must be previously observed, that the land in the parts of America included in this map, is divided into different stages; and that Hudson's river divides the whole into two series, both running parallel to the sea. That to the eastward is so to the Massachusetts bay, at first its direction is nearly north, and then it extends more and more easterly, according to the shape of the shore. This series consists of two stages; and (supposing you travel across it westward from Boston), the first begins about Water town, and continues a rough hilly ground till you are past western; thence to within twenty miles of Hudson's river, the second stage, is for a great part covered with small mountains running here in long chains and ridges; which extend southerly to the sound, dividing Long Island from the main; and form those cliffs, ridges, and broken stony ground which you observe in travelling along the Connecticut colony shore, and prevent the possibility of making a better road in that direction further within land.

(To be continued.)

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

American Birds described and coloured from Nature.

A GREAT work on American Ornithology, has been undertaken by Mr. Alexander Wilson, of Philadelphia. It is proposed to print it in ten volumes, imperial quarto. The figures are to be executed by Messrs. Lawson and Murray, from the author's original drawings. The publishers, Messrs. Bradford and Inskeep, will execute the work on a vellum paper made by Mr. Amies, and with a new type, cast by Messrs. Binny and Ronaldson.

Mr. Wilson promises to correct the errors of the European Naturalists, who have given descriptions and figures of American Birds. He has been engaged during thirteen years, chiefly in this country, in the pursuit of his favourite study. And he engages to be true to nature, in every thing he shall offer to his readers.

The first volume is already finished, and contains, on nine plates, the figures of thirty eight American birds, of the living sizes. The price is twelve dollars, half bound in Morocco.

We shall take further notice of this splendid publication, on a future occasion.

Natural and artificial productions of the South-Sea Islands.

Mr. John Hose of New-York, who has navigated the tracts of the Pacific ocean, not much frequented by mariners, brought with him on his last voyage, many of the curious productions of the places which he had visited.

His collection is more considerable than it might be supposed an individual would be likely to procure. It consists of *natural* and *artificial* subjects. To the former belong, 1. His fine shells from Tongataboo, and the Fejee islands, which would be well worthy of a place in any Museum of conchology. 2. His anatomical specimens, consisting of a human skull of a native New-Hollander; and skulls of the Albatross, Kangaroo, Herring-Hog, and several other ani-

mals. These are valuable articles for the lecturer on craniology. 3. His zoological articles, consisting of the skins, claws, feathers and other parts of animals; forming substantial aids to natural history; 4. His specimens of woods, gums, seeds, barks, and other vegetable productions, employed for various purposes: 5. His minerals; which though not very numerous, contain several valuable pieces. Among the articles of the *artificial* class, are the following, 1. The dresses and ornaments of the natives at Otaheite, Toconroba, and other islands. 2. Their bows, arrows, spears, clubs, shields, and other weapons of war. 3. Their hooks, lines, seins, gigs, and other tackle for catching fish. 4. Their thread, needles, twine, mats, cloth and bedding. 5. Their axes and adzes of stone, their combs, earthen ware, wooden pillows, and baskets. This collection gives an interesting exhibition of the state of the arts, and of the progress of the mind among those sequestered and untutored tribes.

Mr. Hose has also procured in the course of his travels, a rich and extensive collection of coins and medals, ancient and modern.

A fine Sea-Anemone, *found in the bay of New-York.*

The *Sea-flower*, or *Animal-plant*, has often been noticed by Naturalists, and its appearance in its native element, ocean water, is so singular as to have attracted the attention of other persons. Its most remarkable property is, that when it expands its numerous tubes or feelers in quest of food, it resembles a blossom with extended petals. And when those tubes are touched or disturbed, they shrink, somewhat like the sensitive plant, and almost withdraw from sight.

A small species of this curious and beautiful creature, of a flesh colour, has been observed, twenty years ago, to inhabit the rocks of New-York coast, in sheltered places.

But a few weeks ago, Capt. Whiley, the Commandant of Fort Columbus, at New-York, shewed to Dr. Mitchill at the garrison, a larger and handsomer species, found at Bedlow's island, by one of the labourers at the fortifications there.—This creature was not fixed on a rock or fastened to any thing; but was quite detached. It was about an inch and three quarters, or two inches long, and about as much in circuit. The shape was rather oblong. The skin was pretty firm and whitish; and the rest of the animal apparently gelatinous and without bones. At the larger end, the tubes or

feelers were erected, and diverging through the water made a rare and delicate appearance.

This is the *Actinia* of the books. LINNÆUS classed it among the *Vermes*, in the order of *Mollusca*. But DUMERIL has placed it under his class of *Zoophytes*, in the family of *Malacodermes*, or *Soft-skins*. Besides the before mentioned English names, by which it has been called, some of the species have been distinguished by the term *Zoanthos*.

Extract of a Communication to Samuel L. Mitchill, Professor, &c. on the Facts brought to light by the decomposition of the fixed Alkalies, and on the new Metals they are found to contain; extracted from experiments made by Messrs. Gay Lussac and Thenard, dated Paris, June 10, 1808.

The metal of Potash has a metallic splendour, like that of lead. It can be kneaded between the fingers like wax, and it yields more easily to the knife than the purest phosphorus. Its specific gravity is 0,874, that of water being 1. When thrown into water, it inflames, and moves slowly on the liquid. When the inflammation ceases, it usually makes a small explosion, and there remains in the water nothing but very pure caustic potash. To determine the quantity of hydrogen, which the metal disengages in its contact with water, we filled a tube of iron with it, the weight of which was thereby increased by 2,284 *grammes*, and we introduced the tube, which was shut by a dish of glass, under a receiver full of water. Scarcely had the water touched the metal when it was thrown against the upper part of the receiver, and it gave out much hydrogene gas, but without the least appearance of inflammation.

This hydrogene gas was very pure, and formed a volume of 648,92 cubic centimetres, the thermometer being at 60, and the barometer at 76 centimetres.

The metal of the Potash, combines readily with phosphorus and with sulphur: this combination is so intimate, that the moment it takes place, there is a great disengagement of heat and light.

The phosphuret, thrown into the water, forms much phosphorous hydrogene gas which inflames. The sulphuret doubtless forms then a sulphat, and a hydrogenated sulphuret.

It combines also with a great number of metals, and especially with iron and mercury. It renders iron soft, but gives hardness to mercury; and in proportion as these combinations contain more or less of metal, it decomposes water more or less rapidly. Both readily produce this effect. To obtain the first, the two substances must be well heated together, but as soon as the metal of Potash is put upon the Mercury, it flattens, turns round very rapidly, and disappears. If there be much mercury, the combination is liquid, or soft; if the contrary, it is solid.

Of the combinations which this metal is susceptible of forming, there is none more curious, nor more important, than that which results from its action on the gases. It burns rapidly in oxygen gas, at the usual temperature, absorbs it, and is transformed into potash.

In contact with atmospheric air, without increasing the temperature, it has at first a fine blue colour; afterwards in agitating it, it melts, presents a brilliant liquid, inflames, absorbs all the oxygen of the air, is converted into potash, and does not absorb azot. Thus it appears that it has no action on this last gas.

It does not act in the same manner on hydrogene gas: at a high temperature it absorbs a considerable quantity of it, and is transformed into a solid matter of a greyish white colour.

Its action on phosphorated hydrogen gas, as upon sulphurated and arsenical, is still greater than upon hydrogenous gas: at a temperature of about 70 degrees, it decomposes them, and takes hold of the phosphorus, sulphur, arsenic, and a portion of the hydrogen which they contain. The decomposition of phosphorated hydrogen takes place, accompanied with flame. The portion of hydrogen not absorbed remains in a state of gas. Its combustion in nitrous acid gas, and in oxygenated muriatic gas is as lively as in oxygen gas. Sometimes, however, the inflammation does not take place immediately, but this is owing to the metal being covered with muriat, or nitrat of potash, which protects the centre against the action of the gas. Then the substance must be stirred, and a keen light is soon produced. We can immediately, and rigorously analyze nitrous gas, and the gaseous oxyd of azot by the metal of potash. As soon, or almost as soon as this metal is melted, and in contact with these gases, it becomes blue, inflames, absorbs all the oxygene, and leaves the azot naked. This, moreover, is the manner in which it acts

with sulphurous acid gas, and with carbonic acid gas, and with the gaseous oxyd of carbon, proceeding from the decomposition of the carbonat of barytes by iron. With sulphurous acid gas, there is obtained a sulphuret of potash, and no gaseous residue: with carbonic acid gas, and the oxyd of carbon, we obtain charcoal, potash, and never a gaseous residue. Nevertheless, at a very high temperature, the charcoal, with alkalis, may produce these metals which are so easily produced by iron. What convinces us of this is, that in this operation, there is a great disengagement of white vapours, of a particular odour, proceeding from the metal itself; but as we have not been able to obtain any thing else than a charcoal causing effervescence, we concluded that, if by a strong heat metal is produced, the gaseous oxyd of carbon ought to destroy it as the heat becomes less. M. Curaudau, has since proven this more directly by means of an artifice which consists in presenting a cold body to the vapours of the metals, when they are yet exposed to a red heat; then being suddenly condensed, they have not time to change their state. However this be, there results only a very defective plan for separating the metals from the alkalis; because, that on one hand, when we add no iron to the mixture, or do not put it in a gun barrel, we obtain but very little of the metal; and on the other, the small quantity of metal which we obtain, is impure and contains much charcoal. Instead of charcoal, we have no doubt of the possibility of substituting manganese, and zinc instead of iron in the preparation of these metals. Ammoniac, with this metal, exhibited phenomena, worthy of the greatest attention. When we put this metal in contact with ammoniacal gas, and melt it, the metal disappears by degrees, and is transformed into a greyish black substance which melts very easily. There is an absorption which varies, being sometimes a third, sometimes a half, and sometimes two thirds; and the gas which remains is always pure hydrogene gas. Lastly, the fluoric acid presents, in conjunction with this metal, very important phenomena. We put the metal of potash into dry fluoric gas. When cold, there was no action; but when the metal was heated, it tarnished and soon inflamed in a lively manner. All the gas disappears, no other is developed, and the metal is converted into a blackish substance. This being examined made no effervescence with water, it contained fluat of potash, and a very small quantity of charcoal proceeding from the metal employed. We may then presume, that we

have decomposed the fluoric acid; but this decomposition not being demonstrated, we shall not admit it, till we separate the radical, and reproduce this acid.

Account of an HERMAPHRODITE; *communicated by Dr. Wm. Handy, of New-York, to Dr. Miller.*

Having been informed that there was an Hermaphrodite of the human species in this place, I eagerly embraced the opportunity of visiting and examining so rare a phenomenon. The inducement to do so was the greater, as, in common with many others, I had been of the opinion, that an animal, uniting the sexes distinctly, had no existence in nature; that the term Hermaphrodite, with few exceptions,* had been hitherto applied to those females in whom the clitoris was found to be of an uncommon size; and that the enlargement even in them was sometimes the morbid effect of frequent lascivious unnatural excitement, as we learn to have occurred in the case of two Nuns at Rome.

The extraordinary subject of this paper, furnishing perhaps the most singular instance yet recorded of a person participating of the parts of both sexes, is a Portuguese by birth, twenty eight years of age, of a tall and slender, but masculine figure, and of a brown complexion. The penis, and testicles with their common covering, the scrotum, are in the usual situation, of the form and appearance, and very nearly of the size of those of an adult. The præputium covers the glans completely, and admits of being partially retracted, so as to bring into view a portion of that substance, the whole of which can be distinctly felt. On the introduction of a probe, the male urethra appeared to be pervious about a third of its length, beyond which the resistance to its passage was insuperable by any ordinary, justifiable force.—There is a tendency to the growth of a beard, which is kept short by clipping with scissors. The protuberance of the larynx, commonly called pomum Adami, is distinct as in the male.

The female parts do not differ from those of the more perfect sex, except in the size of the labia, which are not so pro-

* The most remarkable I have seen are in the Philosophical transactions, in the cases of Ann Wilde, by Dr. Thomas Allen, London, 1647; and of Marguerite Malause, by M. Veay, *Thoulouse*, 1686.

minent, and also that the whole of the external organs appear to be situated nearer the rectum, and are not surrounded with the usual quantity of hair. The thighs do not possess the tapering fulness common to the exquisitely formed female; the ossa ilia are less expanded, and the breasts are very small. In voice and in manners, as well as in the more distinguishing sexual attributes and faculties, the female predominates. She menstruates regularly, was twice pregnant, and miscarried in the third and fifth months of gestation.—During copulation, the penis becomes erect, and there is in the moment of ecstacy, an agreeable sensation in all the male parts of generation, but more particularly felt in the glans. There has never existed an inclination for commerce with the female, under any circumstances of excitement of the venereal passion. She at present labours under the venereal disease, and has warts on the labia.

Lisbon, 27th April 1807.

Antiquities near the Scioto River, in the State of Ohio.

The signs of antiquity in the state of Ohio, have long been an object of curiosity; nor can any certain idea be formed concerning the ancient settlers, who appear to have been the founders of these curiosities. Such facts as have fallen under my observation, I transmit to you, and should you think them worthy of a place in your useful paper, they are at your service.

About three miles above Chilicothe, on the bank of the Scioto, there are signs of an ancient fortification, so decayed that it is scarcely to be distinguished from the adjacent ground. It forms a circle of about one mile in circumference; and near the extremities of this circle, are deep sinks, from which it may be supposed the earth was taken to form the bulwark, which is at present from one to three feet high. On the inside there are twelve or fifteen mounds, supposed to have been the repositories of the dead. Around this fort, are several others of a very small size, not more than twenty yards in circumference. In various parts of this country, there are various kinds of mounds, which differ materially in their shape. Some have tops peaked off in the form of a pyramid, and others are entirely flat upon the top. I have been told that bones are seldom found in those with peaked tops, and

that those which are found, appear almost mouldered into dust. In those mounds which are flat upon the top, the case is otherwise; and the reason appears to be obvious. We may rationally suppose that the dead bodies were deposited at different periods, and that as they continued the laying on of bodies and earth, the mounds grew to a point. These we suppose to have been finished before the sacking of the country; whilst a strong probability is, that those with flat tops were not finished at that period. The contents therefore of the latter, must have been deposited at a subsequent date, which may be the cause of bones in these being less decayed, than those in the former.

I had waited a long time for some one more adequate to the task, than I can pretend to be, to give a description of these curiosities, which appear to be worthy the attention of the greatest antiquarian. But since I find this not likely to be done, I have commenced it myself, which may probably pave the way for others much more capable of performing the task. Curiosity induced me to open one of the mounds, to satisfy myself as to their being burying places. I commenced in one with a flat top, which did not lay in the neighbourhood of the ancient fort just described. The mound was about twenty yards in circumference, and about six or seven feet high. The earth in this appeared to have been taken from the surface of one adjacent to it, as it was a black mould. In descending about two feet, I came to a layer of earth which was mixed with charcoal: in this mound there were signs of bones, though scarcely to be distinguished. In digging a little deeper, I found a number of human bones, though the skeletons were not whole. They appeared to lie due east and west: the heads were all towards the western part of the mound. As soon as these bones were brought to the air they mouldered, and became as dust. It appears that no correct idea can be formed as to the length of time for which bones will remain in dry earth without decaying. Could this be ascertained, we might form a conjecture as to the time of this country being settled by a civilized people; for it could not have been the Indians, as they never buried their dead in this manner: and besides, it required tools to raise the works, which they were not possessed of. Coals being found in these graves, render it probable, that the bodies were buried on the funeral pile.

Richardson's Chilicothe Fredonian.

June 17th, 1808.

Experiment on curing the ROT IN SHEEP, *by J. Nelson, Esq. of Mecklenburg, Virginia, dated 15th June,* 1808.

I have long thought of communicating to the public, a remedy for the cure of the Rot and Scab in sheep, which I have made use of with very great success. In the year 1806, my flock was so very indifferent that from ninety sheep I sheared only 130 weight of wool, so sorry as to be barely fit to make clothing for young negroes. Immediately after the shearing, I made use of the following mixtures. Three gallons of Tar, and three of Train oil, were boiled together, to which were added three lbs. Roll Brimstone finely powdered and stirred in. This quantity was sufficient for the above number, and was poured on with a kitchen ladle from the top of the head along the back bone to the tail. At the next shearing (in 1807) from 78 of the same sheep, I sheared 260lbs. of very good wool, and instead of 26lbs. to 25 sorry lambs, commonly raised from my flock, I raised 55 as fine as I ever saw. Since this application I have frequently been asked by my neighbours where I got such fine sheep from. This remedy was taken from an old Eastern paper which I am sorry to say, I have lost or mislaid. It may be necessary to add, that I have continued to make use of this application with the same success, and that when train oil is difficult to be had, any kind of grease, such as is used for plantation-leather will answer.

Mineralogical Notices in the county of Onondago, State of New-York.

This fertile region, heretofore possessed by the Iroquois, was given by the state of New-York to the officers and soldiers who served in her regiments to the end of the revolutionary war. The salt springs at Salina are generally known for the purity and abundance of the muriate of soda, which they afford. The neighbouring country contains other mineral substances, which are capable of throwing light on its geological character.

Reuben Humphreys, Esq. has transmitted to Doctor Mitchill some valuable information on the fossils discovered in the Military Tract: " Petrified shells of various kinds are found on my own land ; and similar productions are not un-

frequent in other parts of this western world. Stalactitical concretions are formed, depending from caverns in some places like icicles. They are most remarkable at the newly discovered cavern in the town of Manlius; a description of which you must doubtless have heard long before this.

"There is a process of petrifaction going on at a place in the town of Marcellus, whereby wood is actually turning to stone before the beholder's eyes. The facts are these—a log lies on the descent of a steep hill, the top extends down hill, and almost reaches a considerable stream, called nine mile creek, so named from its being 9 miles west on the public road from the creek in Onondago Hollow. A small spring arises from the place which the roots of this tree formerly occupied. It probably gushed out of this spot when the tree was blown down. As the tree fell directly down hill, the rivulet from the spring trickles along its trunk; it was evidently of the kind we term *White Cedar*, and is now in a decaying condition. The upper side of the log is perfect wood; but the under side is converted to a stony consistence as in the specimens I send you.

"Gypsum is found in the town of Camillus. From appearances, little doubt exists that an abundance of this substance is there. It presents to view a stratum of a number of feet wide, some parts of it look black, some greyish, and some of the exquisite and transparent kind I send you. It may be proper to note that the transparent sort seems to be much the smallest portion, for the largest breadth of the vein is not more than eighteen inches."

"At a place in the town of Camillus, about eight miles from me, are the appearances of an ancient fort, of considerable extent. The works are regularly laid out; and it ought to be made known that the trees growing on the decaying walls are equally large with those generally covering the face of the country. Remnants of the earthen ware, clayey pipes, &c. of the unknown people who formed these structures, have been found and are herewith forwarded. I have meditated collecting a party, and digging more thoroughly into these remains of our native predecessors, with the view of discovering somewhat more about them."

Examination of Medical Candidates in Connecticut.

"The examining committee of the Connecticut Medical Society, for New-London county, met on the 3d of August,

at the house of Thomas Poole, in the city of New-London, and licensed Richard Wait, of New-London, Peter Allen, of Ohio, and John E. Marshall, of Norwich, to practise Physic and Surgery.

Mr. Allen read and defended an elaborate dissertation on Epilepsy. Mr. Marshall's remarks on fever exhibited philosophic accuracy and classic purity, and Mr. Wait's concise though pithy essay on Empiricism, was original, luminous and profound."

Norwich Centinel.

Arrangement for a Museum of Minerals.

A collection of Minerals is calculated to delight the beholder, by the beauty, the variety and the singularity of the specimens. It does more. It enlarges his conceptions of nature, presents to him materials for the employment of art, and displays a wide field for the improvement of Science. But in order to accomplish these desirable ends, system is necessary. Without this the productions of the mineral world would be piled up in heaps, and afford but little pleasure or profit. While by a methodical disposition, they become the easy means of conveying knowledge to the mind. Their usefulness depends so much upon their arrangement, that we make no apology for giving an abstract of the mode adopted by the celebrated PROFESSOR LESKE, of Marpurg, for his own Museum, and which has been followed by Professor HARSTEN, of Berlin, in his description of that collection, as translated from the German into English by GEORGE MITCHELL, M. B. and printed at London in 1798, 2 vols. 8vo.

This celebrated cabinet has a five-fold arrangement: to wit. 1. The CHARACTERISTIC. 2. The SYSTEMATIC. 3. The GEOLOGICAL. 4. The GEOGRAPHICAL, and 5. The ECONOMICAL.

1. In the *Characteristical* part of this Museum, minerals are placed in such order, as to show their respective colours; and among the *solid ones* their external shape, surface and lustre, their internal lustre, fracture and shape of the fragments, figure of the distinct concretions, transparency, streak, stain, hardness, cohesion, flexibility, adhesion to the tongue, sound, and cracking noise of particles when broken: among

the *friable fossils*, their lustre as to its intensity and kind, the appearance of the particles, the stain, degree of friability and adhesion to the tongue: and among the *fluid minerals*, the lustre. Other common generic characters are illustrated in this department, by the unctuosity, coldness, density, smell and taste of the respective pieces.

2. The *Systematic* part follows the Chemical arrangement. It is accordingly distributed into four classes, of EARTHS, SALTS, INFLAMMABLES and METALS.

3. The object of the *Geological* part, is to illustrate the structure and materials of, 1. The primæval rocks; 2. The marigenous rocks; 3. The volcanic rocks, and 4. The alluvial mountains. Herein is likewise demonstrated the production of fossils, in regard to their origin, relative age, and concurring circumstances.

4. By a *Geographical* collection is merely meant that fossils from the same country are placed together without regard to character, system or geology. Thus the minerals from America, Europe, Asia, and Africa, may be seen under their respective titles, or those from any kingdom, country, or district, may be placed together. Or again, the minerals of any particular island, mountain, or province, however diversified they are, may be exhibited in one view, to make a fuller display of its physical geography.

5. The intention of the *Economical* part of the Museum, is to exhibit, 1. The minerals employed for the domestic purposes of buildings, mortar, roofing, flooring, &c. 2. Those used in manufactures, arts and trades, such as statuary, turning, jewelry, pottery, mill-stones, materia-medica, &c. 3. Those from which metals and salts are prepared, of which the different ores are examples: 4. Economical aids, viz. fluxes for melting copper and iron; good stone for the construction of furnaces; and coal and other materials for promoting fusion.

Bell's Anatomy of the Human Body.

Our readers, we are confident, will universally participate the pleasure we feel in announcing that *Messrs. Collins and Perkins* have undertaken to give an American edition of the ANATOMY OF THE HUMAN BODY, by J. and C. BELL, in two large volumes octavo, from the third London edition in four volumes royal octavo, corrected, and illustrated by

one hundred and twenty five engravings. This grand work, embracing by far the most complete system of Anatomy and Physiology in the English language, and possessing a reputation which is extended by the approbation of every additional circle of readers, will thus be published at a price so greatly reduced as to circulate to a wide extent, be adopted as a standard authority in our medical seminaries, and eventually come into the hands of all practitioners of Physic in the United States. We most sincerely congratulate the public on the prospect of acquiring this splendid improvement in the means of cultivating Anatomy and Physiology in every part of our country; as we are confident that the general circulation of this work would be alone sufficient to advance, in a considerable degree, the respectability and usefulness of the medical profession in this new world.

REMARKS *on the decomposition of the* ALKALIES, *communicated by* PROFESSOR WOODHOUSE, *of Philadelphia, to the Editors of the Medical Repository.*

Mr. Frederick Hall, in a letter from Paris, which has been published in several of the Newspapers of the United States, has given an account of some experiments performed by Thenard and Gay Lussac, which are supposed to confirm those of Mr. Davy, relating to the metallic nature of Potash.

Having some time since been engaged in the analysis of *soot*, I mixed together two ounces of potash and six ounces of this substance, and exposed the whole, two hours, to the intense heat of an air furnace. When the mixture became cool, water was added to it, and it immediately took fire.—Supposing that the water was decomposed, I held my nose over the mixture, to smell the hydrogen gas, and I was much surprised, at the disengagement of a large quantity of alkaline air.

This is exactly one of the experiments of the French Chemists, if charcoal is substituted for soot, and when coal is used, there is the same production of alkaline gas.

Now as neither coal nor water contains azote, one of the component parts of ammoniac, must not this air come from the potash?

The prussic acid is likewise formed, and a complicated play of affinities takes place, which at first we would not expect.

Burns's Obstetrical Works.

The distinguished favour with which Mr. Burns's *Anatomy of the Gravid Uterus*, his work on *Abortion*, and that on *Uterine Hemorrhage*, have been received by the most eminent members of the profession, in every part of Great Britain, leaves no room to doubt their meeting a welcome reception in this country, as soon as a cheap edition of them can be circulated. For this purpose, *Messrs. Collins and Perkins* have put them to press in a single octavo volume, and will have them ready for publication, within a few weeks, at one fourth of the price of the British edition. As these works contain the latest improvements and most established principles, both as to doctrine and practice, on the several subjects of which they treat, we shall be pleased to see them in an American dress, and thereby placed within the reach of every individual of the profession.

Prospectus of a Surgical Work.

THE want of a new System of Surgery must be sensibly felt by the great majority of American Surgeons. JOHN BELL'S, the last, and by far the most valuable work in this department of medicine, is so costly as to be read by a small proportion only of the profession in this country. To remedy this inconvenience, application has been made to Mr. John A. Smith, of the Royal College of Surgeons in London, and Professor of Anatomy and Surgery in the College of Physicians and Surgeons, of New-York, to publish an abridged edition of "PRINCIPLES OF SURGERY." But to reduce Mr. Bell's book to any moderate size, to correct where correction might be deemed necessary, to compare him with other authors, and to state the result, would be so to change the work that it could no longer be called BELL'S SURGERY. Moreover, it is certainly improper to publish mutilated copies of a work, particularly during the life of the author. Such an opinion is entertained of the merit of Mr. Bell's performance, that if a cheap edition of it could have been printed here, it would not have been necessary to undertake a new system of Surgery. The work is intended to be so nearly an abridgment of Mr. Bell's, as to supersede the necessity of such a publication, and, at

the same time, so much an original performance as to admit of the introduction of any important matter from other sources. We have no doubt, from the well known abilities and diligence of Mr. Smith, that this work will be executed in such a manner as to be creditable to himself and acceptable to the public. It will consist of two volumes octavo, and be issued from the press of *Messrs. Collins and Perkins.*

State of Weather and Diseases in the Summer and Autumn of 1808.

The last Summer and Autumn have happily passed without any alarm of the malignant epidemic, which in former years had so repeatedly visited our Atlantic cities, and had occasionally appeared in districts of the interior country.—Among the principal causes of this exemption in New-York and Philadelphia, as well as in many others of our large cities, which has now continued since the year 1805, we do not hesitate to reckon the remarkably *moderate heat* of the summers of 1806, 1807, and 1808. The mildness of the two former of those summers, was particularly noticed in our accounts of the weather and diseases which then occurred. The summer heat of 1808, although somewhat greater than that of the preceding year, was on the whole very temperate. The month of June was generally mild, and, except a few very warm days towards the close of it, invariably exhibited that character. A great proportion of July consisted of hot weather, and, during many days, the mercury rose to an unusual height. A continuance of such weather for a much longer period, especially if the requisite degree of moisture and stagnation of atmosphere had been added, would probably have made violent inroads on the public health. But with the termination of July, the state of the weather, most fortunately, underwent a total change, and it assumed a degree of mildness which can rarely be looked for at that period of the year. So cool and uniformly pleasant a month of August was scarcely ever remembered in this part of the United States; and whatever noxious tendencies the season had acquired from the intense heat of the preceding four weeks, they were completely dissipated by the moderate, even, and delightful temperature of that month.

In the early part of August, when the fine weather just mentioned had taken place of the severe heats of July, an epidemic catarrh was observed to commence and prevail for two or three weeks, corresponding in time to that which reigned so generally in August, 1807, but far less frequent and violent. Whether it arose from the remarkable transition of temperature, which then occurred, or from a noxious impregnation of the atmosphere, may admit of question. The *Intermittent and Remittent fevers* of this season were singularly mild, and yielded to a simple treatment.

In the course of the summer and autumn, *Pertussis* prevailed with more or less frequency in different neighbourhoods. *Scarlatina anginosa* appeared in the autumn, became epidemic in some situations, and occasionally assumed a malignant disposition; but in general it was not severe.

An exception to the general exemption of the American cities from Yellow Fever, so happily enjoyed throughout the late season, was experienced by the small town of St. Mary's, on the river of that name, which forms part of the southern boundary of the United States. This town, we are informed, suffered greatly, and indeed was nearly depopulated by that disease. At this time we do not possess a particular account of the circumstances of this local epidemic; but we have taken pains to procure them; and expect on a future occasion, to be able to offer them to our readers.

FOREIGN.

Account of farther discoveries in extracting Metals from the Earths and Alkalis.

The Swedish Chemists, M. Pontin and Berzelius, have succeeded in obtaining amalgams of the metals of lime and barytes, of magnesia and of strontites, by exposing these earths moistened to negatively electrified mercury; but this method has no effect on alumen or silex. These gentlemen have also made a very interesting experiment on ammonia; they placed a solution of it in contact with mercury, negatively electrified, as in the former experiments, and thus succeeded in obtaining a soft amalgam, which proves its metallic nature.

Mr. Davy has since improved on the discovery of the Swedish chemists. The amalgam of barytes and mercury obtained by their method was distilled, and the mercury being driven off, he obtained the metal of barytes in a pure form: and by the same process he procured the metals of strontites and magnesia nearly pure. The earths are mixed with red precipitate which is negatively electrified, the amalgam is absorbed by fresh mercury, and when it becomes semi-fluid, is distilled in the vapour of naptha in a tube of plate glass.

The above facts were communicated by Mr. Davy to the Royal Society a few weeks ago, when he also stated, that in experiments made with a Voltaic battery of 36,000 square inches, on barytes, strontites, and the other alkaline earths, and on silex and alumen; all these bodies, when slightly moistened, and acted on by iron wires negatively electrified, undergo change at the points of contact; and the metals of the earths appear to form alloys with the negatively electrified iron.

Mr. Davy likewise metallized the earths by electrifying them when mixed with the oxides of lead, of silver, or of mercury, when the metals of the earths and the common metals were revived together in the state of alloy.

Since Mr. Davy's first discovery of the metallic nature of the alkalies by the Voltaic battery in last November, several others have been made relative to them and the earths, with a rapidity seldom witnessed before on similar occasions. Soon afterwards the discovery of the French chemists was made, that the metal of potash might be obtained in large quantities without the aid of galvanism, by means of the superior attractions of iron and charcoal for oxigen in a strong heat, and the tendency of the new metal to form an alloy with iron; and in the foregoing short notice are contained no less than four more important discoveries; that of the Swedish chemists, of the effect of negatively electrified mercury in accelerating the metallization of the earths; and those of Mr. Davy, of the obtaining these metals pure, by the distillation of the amalgams so formed; of the operation of the oxides of lead, silver, and mercury, when electrified, in reviving the metals of the earths by forming alloys with them, and of the same effect produced by negatively electrified iron in the metallic state.

The discovery of ammonia being of a metallic nature, shews that it is probable the very air we breathe contains metal in a gaseous state; for azote, which forms a large por-

tion of our atmosphere, has long since been proved to be a component part of ammonia.

Silex and alumen having both proved refractory to the processes which obtained metals from the other earths, gives additional weight to the old opinions of their being of the same nature, or of their being different modifications of the same substance.

The interesting discovery of a metal in potash making it necessary to give this metal a name, and some difficulty having arisen on this point, it may probably be of utility to suggest to those who must decide the matter, that a very unobjectionable name for it is to be found in the Latin word CINIS, which has before been proposed by some authors with much propriety for the designation of pure vegetable alkali.

The name potash properly belongs to the impure mixture of the alkali with other substances, which is an article of commerce, and if the impropriety of giving this name to the pure alkali has already formed a just subject of complaint; surely with much more justice may the barbarous word *Potassium* be objected to as an appellation for the metal from this substance; formed as it is by a very uncouth mixture of two most different languages. If it should be objected to the use of the word cinis for the metal, that it is already claimed to denote pure vegetable alkali, the word *Cinium* will serve equally well for the name of the metal, and cinis may be used, as originally proposed, for the alkali. The word cinium is at least free from those objections which are so obvious in the word potassium; cinium has its composition and derivation from one language, and is sufficiently distinct from all the inflections or cases of the word cinis to prevent its ever being mistaken for any of them.

Athenæum, Sept. 1808.

APPENDIX.

Some Observations on the Action of Muscles, as preventive of the Reduction of Luxations; and on the most simple Method of overcoming that Action, by H. H. Carwardine, Surgeon of Traxted, Essex, in Great Britain.

I HAVE been much surprised among the various authors whom I have consulted, and even the professional men with whom I have conversed upon the subject, to find the genuine principles on which the reduction of luxations should be conducted, so little adverted to in practice. I was particularly led to make this remark by the perusal of Mr. Hey's observations on the subject; for although he seems to come nearer the true principles than any author I have seen, (vide p. 298,) yet his practice in the cases which he afterwards relates, appears to be very little guided by them. What I mean by these principles, is simply this,—a correct knowledge of those causes which prevent our putting a bone, when out, into its place again, and the most simple and obvious mode of overcoming this difficulty.

Surgical writers abound in descriptions of the various luxations to which each bone is liable; the situation into which the head of it may be thrown; and the probable injury sustained by the capsular ligament, and other parts which enter into the composition of a joint; and they are also very ample in describing the direction in which the force is to be applied for the reduction of each of these varieties. A correct knowledge of the anatomy of the joints, and of the relative situation of parts in their natural position, will always supply us with every necessary information on this head, and it is not therefore my intention to dwell upon it.

To come then at once to the object of this paper, and to illustrate by example, I shall suppose a case. A man has luxated his shoulder; the head of the bone lies in the axilla: what prevents my putting it into the socket again? It appears that I have nothing to do but to pull forward the head of the bone, till it comes on a line with the cavity which is to receive it, then make a lever of it by putting my finger just beneath the neck of the bone for a fulcrum, depressing the elbow with the other hand, and thus elevate the head at once

into its place !* Now, the first difficulty which I find oppose itself to this very obvious practice, is, that the scapula being a sort of loose floating bone, the same force which draws down the head of the humerus draws down also the cavity which is to receive it, so that the ball and socket still maintain the same relative situation as before my endeavour; the remedy for this is obvious, the scapula must be fixed to the trunk, and the trunk also will need to be fixed, in order to give the necessary resistance to the extension of the arm. The scapula being fixed then, we now find a new obstacle to our endeavours; for the muscles hold the head of the bone fast in its situation, and it cannot be moved till this power is overcome. Let us advert for one moment to the nature of this power, the most extraordinary in the animal machine. The muscular power we find in its greatest and most violent action, sufficient to snap the tendons, and break the very bones; and it invariably acts with an exertion proportionate to the resistance it has to overcome, as far as the limits of its action extend; but let this exertion be greater or less, it can only be sustained for a given time, when the muscular power becomes exhausted, and relaxation takes place. The most familiar instance of this, is the holding a small weight at arm's length for a given time; in less than five minutes the deltoid muscle becomes tired and painful, its power exhausted, and the arm drops. If this trifling weight, long continued, can exhaust the muscular power, what need of that immense force, and distressing violence, which we daily see employed in the reduction of dislocated joints? Three or four people are set to pull at a towel fastened round the limb; they exert themselves under the idea that the muscles must yield to their united efforts; but thus, great pain is excited, which we know to be a vast stimulus to muscular action, (particularly to that spasmodic action, which it should be our chief object to evade); the muscles do not yield, the arms of the assistants themselves are tired, they relax the extension; in this moment the muscles gain fresh vigour; again extension is made, and again the muscular power effectually resists it, till in this

* And were it not for the action of the muscles, it would doubtless be just as simple a matter as I have here represented it; for in those fortunate cases where the bone is suddenly reduced by a sort of coup de main, this is precisely what happens; the attention of the patient is amused; the muscles are off their guard; their action is eluded, and their watchful irritability deceived by a little gentle handling and motion of the limb; when by a sudden and dexterous performance of the combined motions I have detailed above, the luxation is reduced, because the muscles have not opposed it.

way the patient, surgeon, and assistants are all worried and fatigued; the patient begs a respite, and the surgeon almost ashamed to proceed, directs bleeding, the warm bath, and even a poultice to the joint, that he may lower a power which he imagines he cannot otherwise overcome. All this I have seen practised, and by those too who hold a high rank in their profession! But surely this is not consistent with the genuine principles of our art; these are rude attempts at overcoming the muscular power, (if I may be allowed the expression,) by *main force of Surgery;* when the regular and unremitting extension of a force equal to a very few pounds weight would infallibly exhaust it. I shall illustrate what I have here advanced with a single case, which shall conclude the subject.

John Bridge, a stout muscular man, about 40 years of age, by trade a carter, dislocated his shoulder by the sudden tossing of the head of one of his horses, as he was adjusting a part of the harness; the accident happened in the country; and the surgeon, after some ineffectual attempts to reduce it, bound it up and gave him an embrocation, without explaining to him very clearly what had happened. Not finding his arm get better, and having occasion to come to Smithfield with his cart, he called at ——— Hospital about a fortnight after the accident had happened. One of the senior surgeons was going round and saw him, explained to him the nature of the accident, and proceeded to the reduction of the joint. After repeated and violent attempts, which proved ineffectual, it was proposed to the man to remain in the Hospital till the following day, and in the interim to lose some blood, take a cathartic, and keep a relaxing poultice to the joint. Soon after the surgeon had quitted him, I happened to come into the ward, when the man was pointed out to me by Mr. W—, (a brother dresser,) who informed me of what I have above related. The man was about to leave the hospital, as his business would not admit of his following the advice of the surgeon.

I had had some previous conversation with Mr. W— on the *principles* on which the reduction of luxations should be conducted; and as the man was about to quit the hospital unrelieved, we agreed, that if we could prevail upon him, he would be a very fair subject for an experiment. Having explained myself as well as I could to the comprehension of our patient, he agreed to our proposal, and accompanied us to my lodgings, where having provided the necessary appa-

ratus, the man was seated on a stool, the scapula and trunk firmly fixed, and a set of pullies accurately adjusted and secured to the condyles of the humerus for the purpose of making extension. (The head of the bone was beneath the pectoral muscle.) The cord was now tightened with a force just sufficient to counteract the gravity of the limb, and prevent its falling to his side; Mr. W— with one hand held the wrist to preserve the fore-arm bent, and with the other held the cord to keep it from relaxing, but without tightening it; I took charge of the joint. This extension, which I think could not exceed the force of 16 or 18 pounds weight, was continued for ten minutes without producing any manifest effect; the man experienced little pain, but smiled at our endeavours, and complained of its teazing him to so little purpose. At the end of the ten minutes, as the extension gave so little pain, Mr. W— slightly increased it; in five minutes more the man grew very restless, would not allow that he suffered pain, but said he felt very faint, begged that we would desist, and asked for water, which I refused, telling him I wished for nothing more than his fainting, by which the muscles would be completely relaxed. At this moment he changed countenance; I could perceive the deltoid muscle tremulous; I could hear something like adhesions giving way; Mr. W— pulled the cord a little and the arm followed it; I made the necessary motion of the humerus; the cord was suddenly relaxed, and we found the head of the bone in its place, but no sound was produced by it, as is usual. We bound the man's arm to his side, put the fore-arm in a sling, and directed him not to use it for a week. I have never seen or heard of him since.

This Case appears to me so happily illustrative of the particular point which I wished to maintain and enforce, that I shall decline amplifying the subject by any additional instances from my own observation, though I could easily supply them: but there is one Case in Mr. Hey's "Observations on Surgery," which might be regarded almost as a series of experiments instituted for the purpose of proving the utility of the practice above recommended.

A stout muscular fellow, by trade a stone-mason, dislocated his shoulder by a fall from his horse. The reduction was repeatedly attempted by Mr. Hey and his colleagues of the Leeds Infirmary. The man was raised from the ground several times by vertical pullies. Extension was made by several people in different directions. He was laid upon the

ground, and one gentleman put his heel in the armpit, and another his foot on the acromion scapulæ. He was twice bled and went into the warm bath, and then had all these operations repeated; when "Mr. Jones suggested the idea of letting his arm fall down without any farther extension. This was done in a gentle manner, but so that the arm fell by its own weight. In this motion the head of the bone slipped into its socket!"

Mr. Pott has given us a few pages on the subject of Luxations. He does not *limit* the force to be applied; but speaks of the propriety of increasing the extension *gradually*. He certainly does not appear aware of the *small* degree of force which will effect the purpose with absolute certainty, if *long continued*.

Boyer, in his celebrated Lectures on Diseases, &c. of the Bones, wherein he speaks at great length on the treatment of Luxations; although he alludes to the principles which I have endeavoured to illustrate and enforce, yet lays very little stress on their advantage, and has no idea of pullies being employed as a means of effecting the reduction with *less force* than by manual exertion; and, therefore, very wisely forbids the use of them altogether. My idea of the use of the pulley, is, that by its assistance we can employ *a force more under our power of regulation; much less in degree, more equal, and longer continued*, than by any other means; and that these are the *essential* points to be attended to in overcoming the muscular resistance to the reduction of all luxations.

"It is impossible," (says Boyer) "to assign the precise degree of force to be employed: it is to be varied and proportioned according to the strength of the patient, and the number and force of the muscles surrounding the articulation. It has been said, that in reducing a luxation there is occasion for more address than force: it would be true to say that the union of both is necessary. Often six assistants accomplish that which three cannot do, and nine or ten accomplish what cannot be done by six. But when the reduction cannot be effected by the number of assistants which we in reason suppose capable of overcoming the resistance, all further attempts must be suspended. The action of pullies, or any other machine analogous to them, would sooner tear the integuments than produce an elongation of the muscles."

"If these means prove insufficient, the patient is to be repeatedly bled, after short intervals; he is to use the warm bath, and be confined to a very low diet. At the end of

twenty-four hours, when he is brought down by this treatment, the luxation, before irreducible in appearance, may now be reduced with facility."

On the principle of exhausting the muscular action, Mr. Boyer writes thus:

"Lastly, one more resource remains, which has sometimes succeeded; it was first employed by Lecat, in a luxation of the jaw, and consists in fatiguing by continual action, the muscles which surround the luxated bone. It is well known that the contractile faculty of our organs is exhausted by exercising them too long, and that the frequent repetition of their contractions necessarily brings about a collapse; the surgeon just cited availed himself of this fact. The levatores muscles of the lower jaw were spasmodically contracted in a case of luxation of that bone, and would not admit of having it brought down. Lecat introduced a small stick between the teeth, and making use of it as a lever, combated the action of the muscles, until they fell into a state of atony, and allowed him to accomplish the reduction. David has derived similar advantages from the same practice, in luxations of the thigh and arm. This circumstance enables us to explain why a luxation that has resisted the fruitless efforts of an intelligent surgeon, aided by a sufficient number of assistants, afterwards yields to a much less considerable degree of force, used by a less dexterous practitioner."

I have ventured to encroach upon the pages of your journal by these long extracts, because I thought, from the celebrity of the author, his work might be supposed to convey to us a pretty accurate summary of the practice on this particular point, among our continental brethren.

The extracts scarcely need a comment;—force, almost unlimited force, is the decided practice of Boyer. The power of "six," even "nine or ten!" men, is employed by him to do that, which he acknowledges has yielded to *less force in more unskilful hands!* And so far is the principle which I have endeavoured to establish, from governing the general practice of the French surgeons, that it is only resorted to by them, as a sort of dernier resource, which has sometimes succeeded *after* all their *more violent* endeavours had failed them!

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